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Part Two

DRAFT

SILVER BOW CREEK

REMEDIAL INVESTIGATION FINAL REPORT
APPENDIX B, PART 2
Attachments I - IV
Historic Data, Well Information, and Sample Procedures

STATE DOCUMENTS COLLECTION

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GROUND WATER AND TAILINGS INVESTIGATION

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SILVER BOW CREEK REMEDIAL INVESTIGATION
DRAFT FINAL REPORT

GROUND WATER AND POINT SOURCE INVESTIGATION
Part 2: Attachments I-IV
Historic Data, Well Information, and Sample Procedures

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ATTACHMENT I

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ATTACHMENT I-A
SILVER BOW CREEK HISTORIC GROUND-WATER DATA

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RI WELL NUMBER	CROSS REFERENCE WELL NUMBER	LEGAL LOCATION	SAMPLE DATE	SAMPLER	SAMPLING METHOD	STATIC WATER LEVEL (ft. blw. MP)	PHYSICAL PARAMETERS Water Temperature (C)	pH Field	pH Lab	Specific Conductance Field	Specific Conductance Lab
DW-101	AMC #5	T03N R07W S17 CC	07/24/84	AMC	PUMPED	72.9	11.5	5.0	4.43	2667	2016
DW-101	AMC #5	T03N R07W S17 CC	07/23/85	AMC	PUMPED	76.2	12	5.1	4.11	26.42	2930
DW-102	AMC #5	T03N R07W S17 CC	07/24/84	AMC	PUMPED	31.7	9.0	6.6	5.83	1584	1367
DW-102	AMC #6	T03N R07W S17 CC	07/23/85	AMC	PUMPED	34.7	9.5	6.3	6.36	1249	1340
DW-103	AMC #8	T03N R07W S20 ABA	07/24/84	AMC	PUMPED	58.35	9.0	7.2	6.06	350	361
DW-103	AMC #8	T03N R07W S20 ABA	07/23/85	AMC	PUMPED	61.2	9.5	6.4	6.87	387	439
DW-105	AMC #12	T03N R07W S19 AAC	10/20/82	AMC/MULTITECH	PUMPED	17.6	9	5.5	5.2	1500	2600
DW-105	AMC #12	T03N R07W S19 AAC	04/27/83	AMC/MULTITECH	PUMPED	18.2	9	5.6	5.19	2800	2770
DW-105	AMC #12	T03N R07W S19 AAC	07/27/83	AMC/MULTITECH	PUMPED	17.7	9	5.6	5.07	3120	2347
DW-105	AMC #12	T03N R07W S19 AAC	10/12/83	AMC/MULTITECH	PUMPED	17.5	9	5.7	5.31	3067	2280
DW-105	AMC #12	T03N R07W S19 AAC	04/25/84	AMC/MULTITECH	PUMPED	19.6	9	5.9	3.78	3061	2652
DW-105	AMC #12	T03N R07W S19 AAC	07/24/84	AMC	PUMPED	19.0	9.5	5.9	5.21	3079	2240
DW-105	AMC #12	T03N R07W S19 AAC	07/24/84	AMC	PUMPED	19.0	9.5	5.9	5.21	3079	2240
DW-105	AMC #12	T03N R07W S19 AAC	07/24/85	AMC	PUMPED	20.5	9.5	5.6	5.6	2872	2970
DW-105	AMC #12	T03N R07W S19 AAC	07/24/85	AMC	PUMPED	20.5	9.5	5.6	5.60	2872	2970
DW-106	AMC #15	T03N R07W S20ADA	07/24/84	AMC	PUMPED	87.3	9.0	7.1	6.64	561	558
DW-106	AMC #15	T03N R07W S20 ADA	07/23/85	AMC	PUMPED	89.9	9	6.8	6.95	554	616
DW-107	AMC #13	T03N R07W S19 ADC	07/25/84	AMC	PUMPED	17.9	10.0	6.8	5.86	1430	1071
DW-107	AMC #13	T03N R07W S19 ADC	07/24/85	AMC	PUMPED	19.0	10	6.3	6.35	1375	1450
DW-108	MBMG MF-5	T03N R07W S19 BAC	10/03/83	MBMG	BAILED	11.4	10	5.9		1911	
DW-108	MBMG MF-5	T03N R07W S19 BAC	10/24/83	MBMG	BAILED	11.5	10			1642	
DW-108	MBMG MF-5	T03N R07W S19 BAC	11/12/83	MBMG	BAILED	11.6	11	6.2		1885	
DW-108	MBMG MF-5	T03N R08W S19 BAC	09/25/84	MBMG	BAILED	10.4	10			1569	
DW-109	MBMG MF-6	T03N R07W S19 BAD	10/03/83	MBMG	BAILED	10.5	10	6.0		3764	
DW-109	MBMG MF-6	T03N R07W S19 BAD	10/24/83	MBMG	BAILED	10.8	10			3713	
DW-109	MBMG MF-6	T03N R07W S19 BAD	11/12/83	MBMG	BAILED	10.9	11	6.3		3731	
DW-109	MBMG MF-6	T03N R07W S19 BAD	09/25/84	MBMG	BAILED	12.0	11			2853	
DW-110	MBMG MF-7	T03N R07W S19 BDA	09/25/83	MBMG	BAILED	7.5	12			2896	
DW-110	MBMG MF-7	T03N R07W S19 BDA	10/03/83	MBMG	BAILED	6.3	10	5.7		3588	
DW-110	MBMG MF-7	T03N R07W S19 BDA	10/24/83	MBMG	BAILED	6.4	9			3580	
DW-110	MBMG MF-7	T03N R07W S19 BDA	11/12/84	MBMG	BAILED	6.5	9	6.5		3660	
DW-111	MBMG MF-11	T03N R07W S19 BDC	10/03/83	MBMG	BAILED	5.8	11	7.0		1168	
DW-111	MBMG MF-11	T03N R07W S19 BDC	10/15/83	MBMG	BAILED	6.0	10			1057	
DW-111	MBMG MF-11	T03N R07W S19 BDC	11/12/83	MBMG	BAILED	6.1	10	6.9		1024	
DW-111	MBMG MF-11	T03N R07W S19 BDC	09/25/84	MBMG	BAILED	5.6	12			1039	
DW-112	MBMG MF-9	T03N R07W S19 CBA	10/03/83	MBMG	BAILED	6.3	10	6.4		1126	
DW-112	MBMG MF-9	T03N R07W S19 CBA	10/24/83	MBMG	BAILED	6.4	8			1152	
DW-112	MBMG MF-9	T03N R08W S19 CBA	11/12/83	MBMG	BAILED	6.5	8	6.7		1149	
DW-112	MBMG MF-9	T03N R07W S19 CBA	09/25/84	MBMG	BAILED	6.0	9			1019	
DW-113	MBMG MF-10	T03N R07W S19 CBB	10/03/83	MBMG	BAILED	8.0	10	6.4		2041	
DW-113	MBMG MF-10	T03N R08W S19 CBB	10/15/83	MBMG	BAILED	8.2	10			1895	
DW-113	MBMG MF-10	T03N R07W S19 CBB	11/12/83	MBMG	BAILED	8.3	9	6.4		1878	
DW-113	MBMG MF-10	T03N R07W S19 CBB	09/25/84	MBMG	BAILED	9.0	10			1407	
DW-114	MBMG MF-8	T03N R07W S19 BCC	10/03/83	MBMG	BAILED	3.3	9	6.5		2087	
DW-114	MBMG MF-8	T03N R07W S19 BCC	10/24/83	MBMG	BAILED	3.3	9			2060	

NOTE: Units are mg/l unless otherwise noted.

COMMON IONS:

RI WELL NUMBER	SAMPLE DATE	Sulfate	Chloride	Nitrate as N	Total Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hardness as CaCO3	Calcium	Magnesium	Potassium	Sodium
DW-101	07/24/84	1758	12.8	<0.1	0.0	0.0	0.0	1380	338	53	20.0	64.6
DW-101	07/23/85	1987	<0.5	<0.5	<2	<2	<2	1340	400	63.2	56.9	56.9
DW-102	07/24/84	917	12.3	1.4	25.3	25.3	0.0	880	245	61.0	10.5	34.4
DW-102	07/23/85	786	11	2.0	29	30	<2	689	193	47.5	5.04	27.6
DW-103	07/24/84	84.8	10.8	6.06	47.0	47.0	0.0	218	40.8	11.2	6.19	13.0
DW-103	07/23/85	105	14	7.4	53	53	<2	140	54.3	14.4	3.83	12.3
DW-105	10/20/82	2320	17.5	.7	11.0	11.0			479	115	21.2	49
DW-105	04/27/83	2180	15.0	<.2	5.0	5.0			480	115.4	34.6	57
DW-105	07/27/83	2696	19.5	<.1	16.0	16.0			531	111.0	19.1	48.0
DW-105	10/12/83	1970	18.5	<.1	6.0	6.0			438.0	117.0	41.5	49.1
DW-105	04/25/84	2017	19.0	0.1	1.3	1.3			448	111.0	29.0	49.0
DW-105	07/24/84	1986	18.3	<0.1	2.9	2.9	0.0	1925	435	122	25.5	56.8
DW-105	07/24/84	1986	18.3	<0.1	2.9	2.9	0.0	1925	435	122	25.5	56.8
DW-105	07/24/85	2210	20	<0.5	7	7	<2	1820	404	113	19.8	45.9
DW-105	07/24/85	2210	20	<0.5	7	7	<2	1820	113	113	19.8	45.9
DW-106	07/24/84	203	4.00	1.51	61.0	61.0	0.0	231	71.0	15.1	5.42	25.1
DW-106	07/23/85	251	5	2.2	64	64	<2	202	101	18.1	5.16	22.6
DW-107	07/25/84	787	13.0	0.78	30.8	30.8	0.0	623	200	60.4	9.37	35.8
DW-107	07/24/85	750	13	1.2	35	35	<2	763	240	70.3	6.06	35.2
DW-108	10/03/83											
DW-108	10/24/83											
DW-108	11/12/83											
DW-108	09/25/84											
DW-109	10/03/83											
DW-109	10/24/83											
DW-109	11/12/83											
DW-109	09/25/84											
DW-110	09/25/83											
DW-110	10/03/83											
DW-110	10/24/83											
DW-110	11/12/84											
DW-111	10/03/83											
DW-111	10/15/83											
DW-111	11/12/83											
DW-111	09/25/84											
DW-112	10/03/83											
DW-112	10/24/83											
DW-112	11/12/83											
DW-112	09/25/84											
DW-113	10/03/83											
DW-113	10/15/83											
DW-113	11/12/83											
DW-113	09/25/84											
DW-114	10/03/83											
DW-114	10/24/83											

NOTE: Units are mg/l unless otherwise noted.

METALS

RI WELL NUMBER	SAMPLE DATE	Arsenic Dissolved	Arsenic Total	Arsenic Total recov.	Cadmium Dissolved	Cadmium Total	Cadmium Total recov.	Copper Dissolved	Copper Total	Copper Total recov.	Mercury Dissolved	Mercury Total
DW-101	07/24/84	<0.005			0.555			22.8			<0.001	
DW-101	07/23/85	<0.005			0.398			23.9			<0.002	
DW-102	07/24/84	<0.005			0.088			0.083			<0.001	
DW-102	07/23/85	<0.005			0.059			0.069			<0.002	
DW-103	07/24/84	<0.005			0.003			0.018			<0.001	
DW-103	07/23/85	<0.005			0.002			0.070			<0.002	
DW-105	10/20/82	.068			.258			4.78			<.0004	
DW-105	04/27/83	<.004			.412			2.64			<.0005	
DW-105	07/27/83	<.005			0.464			1.71			<.0005	
DW-105	10/12/83	<.005			0.427			2.20			<.002	
DW-105	04/25/84	<.005			0.234			1.90			<.001	
DW-105	07/24/84	<0.005			<0.1			1.69			<0.001	
DW-105	07/24/84	<0.005			0.345			1.69			<0.001	
DW-105	07/24/85	<0.005			0.303			2.85			<0.002	
DW-105	07/24/85	<0.005			0.303			2.85			<0.002	
DW-106	07/24/84	<0.005			<0.001			0.017			<0.001	
DW-106	07/23/85	<0.005			<0.002			<0.011			<0.002	
DW-107	07/25/84	<0.005			0.011			0.033			<0.001	
DW-107	07/24/85	<0.005			0.008			0.030			<0.002	
DW-108	10/03/83											
DW-108	10/24/83											
DW-108	11/12/83											
DW-108	09/25/84											
DW-109	10/03/83											
DW-109	10/24/83											
DW-109	11/12/83											
DW-109	09/25/84											
DW-110	09/25/83											
DW-110	10/03/83											
DW-110	10/24/83											
DW-110	11/12/84											
DW-111	10/03/83											
DW-111	10/15/83											
DW-111	11/12/83											
DW-111	09/25/84											
DW-112	10/03/83											
DW-112	10/24/83											
DW-112	11/12/83											
DW-112	09/25/84											
DW-113	10/03/83											
DW-113	10/15/83											
DW-113	11/12/83											
DW-113	09/25/84											
DW-114	10/03/83											
DW-114	10/24/83											

NOTE: Units are mg/l unless otherwise noted. * = Micrograms/liter.

RI WELL NUMBER	SAMPLE DATE	METALS Iron Dissolved	Iron Total	Iron Tot. recov.	Lead Dissolved	Lead Total	Lead Tot. recov.	Manganese Dissolved	Manganese Total	Manganese Tot. recov.	Zinc Dissolved	Zinc Total	Zinc Tot. recov.
DW-101	07/24/84	279			0.022			51.8			99.8		
DW-101	07/23/85	289			0.019			51.8			109		
DW-102	07/24/84	9.16			<0.005			0.083			14.8		
DW-102	07/23/85	5.61			<0.005			13.3			8.70		
DW-103	07/24/84	0.197			<0.005			0.069			0.101		
DW-103	07/23/85	0.235			<0.005			<0.033			0.168		
DW-105	10/20/82	6.78			.10			132			97.8		
DW-105	04/27/83	17.3			.012			140			91.7		
DW-105	07/27/83	17.06			0.04			171.1			97.0		
DW-105	10/12/83	24.7			<.005			117			59.7		
DW-105	04/25/84	17.1			<.005			105			79.4		
DW-105	07/24/84	15.9			<0.005			170			99.5		
DW-105	07/24/84	15.9			<0.005			170			99.5		
DW-105	07/24/85	14.0			<0.005			143			86.9		
DW-105	07/24/85	14.0			<0.005			143			86.9		
DW-106	07/24/84	0.314			<0.005			<0.05			0.068		
DW-106	07/23/85	0.731			<0.005			0.053			0.049		
DW-107	07/25/84	5.08			<0.005			21.6			2.39		
DW-107	07/24/85	6.24			<0.005			23.2			2.82		
DW-108	10/03/83												
DW-108	10/24/83												
DW-108	11/12/83												
DW-108	09/25/84												
DW-109	10/03/83												
DW-109	10/24/83												
DW-109	11/12/83												
DW-109	09/25/84												
DW-110	09/25/83												
DW-110	10/03/83												
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DW-111	10/03/83												
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DW-111	09/25/84												
DW-112	10/03/83												
DW-112	10/24/83												
DW-112	11/12/83												
DW-112	09/25/84												
DW-113	10/03/83												
DW-113	10/15/83												
DW-113	11/12/83												
DW-113	09/25/84												
DW-114	10/03/83												
DW-114	10/24/83												

NOTE: Units are mg/l unless otherwise noted. * = Micrograms/liter.

RI WELL NUMBER	SAMPLE DATE	Total Dissolved Solids	PHOSPHATE Ortho-Phosphate	PHOSPHATE Total Phosphate	Flouride	Ammonia as N	Kjeldahl Nitrogen	REMARKS
DW-101	07/24/84	3100						
DW-101	07/23/85	3020			<0.5			
DW-102	07/24/84	1502						
DW-102	07/23/85	1240						
DW-103	07/24/84	274						
DW-103	07/23/85	330						
DW-105	10/20/82	3112			.7			
DW-105	04/27/83	3294			1.1			
DW-105	07/27/83	3879			1.95			
DW-105	10/12/83	3284			1.6			
DW-105	04/25/84	3322			1.08			
DW-105	07/24/84	3408						
DW-105	07/24/84	3408						
DW-105	07/24/85	3320						
DW-105	07/24/85	3320						
DW-106	07/24/84	445						
DW-106	07/23/85	469						
DW-107	07/25/84	1302						
DW-107	07/24/85	1360						
DW-108	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-108	10/24/83							MEASURED FIELD PARAMETERS ONLY.
DW-108	11/12/83							MEASURED FIELD PARAMETERS ONLY.
DW-108	09/25/84							MEASURED FIELD PARAMETERS ONLY.
DW-109	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-109	10/24/83							MEASURED FIELD PARAMETERS ONLY.
DW-109	11/12/83							MEASURED FIELD PARAMETERS ONLY.
DW-109	09/25/84							MEASURED FIELD PARAMETERS ONLY.
DW-110	09/25/83							MEASURED FIELD PARAMETERS ONLY.
DW-110	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-110	10/24/83							MEASURED FILED PARAMETERS ONLY.
DW-110	11/12/84							MEASURED FIELD PARAMETERS ONLY.
DW-111	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-111	10/15/83							MEASURED FIELD PARAMETERS ONLY.
DW-111	11/12/83							MEASURED FIELD PARAMETERS ONLY.
DW-111	09/25/84							MEASURED FIELD PARAMETERS ONLY.
DW-112	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-112	10/24/83							MEASURED FIELD PARAMETERS ONLY.
DW-112	11/12/83							MEASURED FIELD PARAMETERS ONLY.
DW-112	09/25/84							MEASURED FIELD PARAMETERS ONLY.
DW-113	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-113	10/15/83							MEASURED FIELD PARAMETERS ONLY.
DW-113	11/12/83							MEASURED FIELD PARAMETERS ONLY.
DW-113	09/25/84							MEASURED FIELD PARAMETERS ONLY.
DW-114	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-114	10/24/83							MEASURED FIELD PARAMETERS ONLY.

NOTE: Units are mg/l unless otherwise noted.

RI WELL NUMBER	CROSS REFERENCE WELL NUMBER	LEGAL LOCATION	SAMPLE DATE	SAMPLER	SAMPLING METHOD	STATIC WATER LEVEL (ft. blw. MP)	PHYSICAL Water Tempera- ture (C)	PARAMETERS pH Field	pH Lab	Specific Conductance Field	Specific Conductance Lab
DW-114	MBMG MF-8	T03N R07W S19 BCC	11/12/83	MBMG	BAILED	3.4	9	6.8		2059	
DW-114	MBMG MF-8	T03N R07W S19 BCC	09/25/84	MBMG	BAILED	2.7	10			1620	
DW-115	MBMG MF-4	T03N R07W S19 BCC	10/03/83	MBMG	BAILED	14.3	8	7.0		1674	
DW-115	MBMG MF-4	T03N R07W S19 BCC	10/24/83	MBMG	BAILED	14.2	8			1707	
DW-115	MBMG MF-4	T03N R07W S19 BCC	11/12/83	MBMG	BAILED	14.5	8	7.1		1580	
DW-115	MBMG MF-4	T03N R07W S19 BCC	09/25/84	MBMG	BAILED	14.2	8			1545	
DW-116	AMC #23	T03N R08W S24 DAA	10/20/82	AMC/MULTITECH	PUMPED	5.3	8.0	6.2	6.3	1300	2240
DW-116	AMC #23	T03N R08W S24 DAA	04/27/83	AMC/MULTITECH	PUMPED	5.6	7	6.7	6.46	2104	
DW-116	AMC #23	T03N R08W S24 DAA	07/27/83	AMC/MULTITECH	PUMPED	5.2	7.5	6.6	6.22	2480	2017
DW-116	AMC #23	T03N R08W S24 DAA	10/12/83	AMC/MULTITECH	PUMPED	5.0	8.0	6.8	6.35	2437	2044
DW-116	AMC #23	T03N R08W S24 DAA	04/25/84	AMC/MULTITECH	PUMPED	5.4	7	6.5	6.01	2398	2264
DW-116	AMC #23	T03N R07W S24 DAA	07/25/84	AMC	PUMPED	5.4	7.5	6.6	6.07	2457	2053
DW-116	AMC #23	T03N R07W S24 DAA	07/24/85	AMC	PUMPED	5.5	8	6.5	6.57	2324	2510
DW-117	MBMG MF-3	T03N R08W S24 DAA	10/03/83	MBMG	BAILED	4.5	11	7.7		898	
DW-117	MBMG MF-3	T03N R08W S24 DAA	10/24/83	MBMG	BAILED	4.7	10			916	
DW-117	MBMG MF-3	T03N R08W S24 DAA	11/12/83	MBMG	BAILED	4.8	8.5	7.2		986	
DW-117	MBMG MF-3	T03N R08W S24 DAA	09/25/84	MBMG	BAILED	4.9	12			705	
DW-118	AMC #24	T03N R08W S24 DAD	10/20/82	AMC/MULTITECH	PUMPED	9.0	9.0	6.2	6.5	950	1060
DW-118	AMC #24	T03N R08W S24 DAD	04/27/83	AMC/MULTITECH	PUMPED	9.1	9	6.9	6.58	1089	1130
DW-118	AMC #24	T03N R08W S24 DAD	07/27/83	AMC/MULTITECH	PUMPED	9.0	9	6.7	6.41	1110	1110
DW-118	AMC #24	T03N R08W S24 DAD	10/12/83	AMC/MULTITECH	PUMPED	9.1	10	6.8	6.49	1095	976
DW-118	AMC #24	T03N R08W S24 DAD	04/25/84	AMC/MULTITECH	PUMPED	9.3	8.5	6.7	6.19	1009	1098
DW-118	AMC #24	T03N R08W S24 DAD	07/25/84	AMC	PUMPED	9.2	8.5	6.8	6.28	1064	935
DW-118	AMC #24	T03N R08W S24 DAD	07/24/85	AMC	PUMPED	9.4	9	6.5	6.81	1006	1100
DW-119	MBMG MF-2	T03N R08W S24 DAC	10/03/83	MBMG	BAILED	13.5	12	6.7		4680	
DW-119	MBMG MF-2	T03N R08W S24 DAC	10/24/83	MBMG	BAILED	13.8	11			3974	
DW-119	MBMG MF-2	T03N R08W S24 DAC	11/12/83	MBMG	BAILED	13.8	9	6.6		3934	
DW-119	MBMG MF-2	T03N R08W S24 DAC	09/25/84	MBMG	BAILED	13.8	10			5348	
DW-121	MBMG MF-1	T03N R08W S24 DBC	10/03/83	MBMG	BAILED	3.3	12	6.7		397	
DW-121	MBMG MF-1	T03N R08W S24 DBC	10/24/83	MBMG	BAILED	3.4	11			396	
DW-121	MBMG MF-1	T03N R08W S24 DBC	11/12/83	MBMG	BAILED	3.4	8	6.8		408	
DW-121	MBMG MF-1	T03N R08W S24 DBC	09/25/84	MBMG	BAILED	3.5	9			415	
DW-134	MBMG CT-84-1	T03N R08W S23 DABD	05/02/84	MBMG	BAILED		8.2	6.12		1201	
DW-134	MBMG CT-84-1	T03N R08W S23 DAB	05/02/84						6.9		1240
DW-136	MBMG CT-84-2	T03N R08W S24 CBA	05/04/84	INTRASEARCH					4.9		1770
DW-136	MBMG CT-84-2	T03N R08W S23 CBBB	05/04/84	MBMG	PUMPED		7.5	5.24		1717.6	
DW-137	MBMG CT-84-3	T03N R08W S24 CBA	05/02/84	INTRASEARCH					6.1		2370
DW-137	MBMG CT-84-3	T03N R08W S23 CBBB	05/04/84	MBMG	PUMPED		7.3	5.85		2410	
DW-219	STAUFF. #1	T03N R09W S23 DAA	10/01/82	MBMG	PUMPED	40	10.1	7.5	7.25	1016	1051
DW-220	STAUFF. #7	T03N R09W S23 DAD	10/01/82	MBMG	PUMPED	44	9.5	7.4	7.5	989	964
DW-340	AMC #29	T05N R10W S36 CAC	07/29/74	AMC		8.8					
DW-340	AMC #29	T05N R10W S36 CAC	08/12/74	AMC		8.8					
DW-340	AMC #29	T05N R10W S36 CAC	08/26/74	AMC		8.8					
DW-340	AMC #29	T05N R10W S36 CAC	09/16/74	AMC		8.7					
DW-340	AMC #29	T05N R10W S36 CAC	11/19/74	AMC		8.8					

NOTE: Units are mg/l unless otherwise noted.

COMMON IONS:

RI WELL NUMBER	SAMPLE DATE	Sulfate	Chloride	Nitrate as N	Total Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hardness as CaCO3	Calcium	Magnesium	Potassium	Sodium
DW-114	11/12/83											
DW-114	09/25/84											
DW-115	10/03/83											
DW-115	10/24/83											
DW-115	11/12/83											
DW-115	09/25/84											
DW-116	10/20/82	1580	37.5	3.0	94	94			478	104	14.4	93.6
DW-116	04/27/83	1170	31.0	3.9	82	82			386	88.5	17	89
DW-116	07/27/83	1368	40.0	2.42	96.0	96.0			427.0	88.0	5.20	90.0
DW-116	10/12/83	1446	38.5	11.0	86.0	86.0			403	101.0	24.0	90.5
DW-116	04/25/84	1471	40.5	4.1	87.0	87.0			428	116.0	14.4	91.8
DW-116	07/25/84	1426	41.3	4.84	94.0	94.0	0.0	1180	385	102	16.3	135
DW-116	07/24/85	1510	41	33.9	91	91	<2	1380	400	102	13.8	90.2
DW-117	10/03/83											
DW-117	10/24/83											
DW-117	11/12/83											
DW-117	09/25/84											
DW-118	10/20/82	460	37.3	4.8	111	111			131	42.2	9.7	53.8
DW-118	04/27/83	392	31.5	4.2	107	107			142	38.6	9.56	49
DW-118	07/27/83	464.0	40.5	2.05	112.0	112.0			131.0	34.0	4.81	50.8
DW-118	10/12/83	394	30.5	13.0	100.0	100.0			83.0	42.4	16.5	53.5
DW-118	04/25/84	402	30.5	4.5	93.0	93.0			89.0	46.0	29.7	51.3
DW-118	07/25/84	413	30.8	5.25	97.6	97.6	0.0	565	113	35.7	9.57	53.2
DW-118	07/24/85	481	20	4.8	94	94	<2	468	137	37.7	6.97	49.3
DW-119	10/03/83											
DW-119	10/24/83											
DW-119	11/12/83											
DW-119	09/25/84											
DW-121	10/03/83											
DW-121	10/24/83											
DW-121	11/12/83											
DW-121	09/25/84											
DW-134	05/02/84	510	22.1	0.82		135.7			135	29.9	12.1	52.7
DW-134	05/02/84	560	25	0.71	100	122	0	526	155	34	13	98
DW-136	05/04/84	766	50	1.30	0	0	0	520	134		7	447
DW-136	05/04/84	1030	22.7	0.55		12.2			118	34.3	7.8	33.5
DW-137	05/02/84	1680	26	1.28	28	34	0	1030	302	67	13	545
DW-137	05/04/84	1620	24.3	0.59		26.0			247	45.6	12.7	35.3
DW-219	10/01/82	360	66.8	1.74	90.05	109.8	0	463.62	141	27.1	14.4	37.8
DW-220	10/01/82	342	49.8	2.36	92.43	112.7	0	440.79	134	25.8	11.6	33.5
DW-340	07/29/74											
DW-340	08/12/74											
DW-340	08/26/74											
DW-340	09/16/74											
DW-340	11/19/74											

NOTE: Units are mg/l unless otherwise noted.

METALS

RI WELL NUMBER	SAMPLE DATE	Arsenic Dissolved	Arsenic Total	Arsenic Total recov.	Cadmium Dissolved	Cadmium Total	Cadmium Total recov.	Copper Dissolved	Copper Total	Copper Total recov.	Mercury Dissolved	Mercury Total
DW-114	11/12/83											
DW-114	09/25/84											
DW-115	10/03/83											
DW-115	10/24/83											
DW-115	11/12/83											
DW-115	09/25/84											
DW-116	10/20/82	.019			.02			.2			.006	
DW-116	04/27/83	<.004			.021			.18			<.0005	
DW-116	07/27/83	.005			0.051			0.19			<.0005	
DW-116	10/12/83	<.005			.0375			.182			<.002	
DW-116	04/25/84	0.01			0.031			0.176			<.001	
DW-116	07/25/84	<0.005			0.033			0.183			<0.001	
DW-116	07/24/85	<0.005			0.032			0.190			<0.002	
DW-117	10/03/83											
DW-117	10/24/83											
DW-117	11/12/83											
DW-117	09/25/84											
DW-118	10/20/82	.02			<.006			.03			.0009	
DW-118	04/27/83	.03			<.008			.01			<.0005	
DW-118	07/27/83	0.012			0.02			<.03			<.0005	
DW-118	10/12/83	0.015			.0022			.0038			<.002	
DW-118	04/25/84	0.078			0.002			<.005			<.001	
DW-118	07/25/84	0.025			0.002			0.022			<0.01	
DW-118	07/24/85	0.018			0.004			<0.011			<0.002	
DW-119	10/03/83											
DW-119	10/24/83											
DW-119	11/12/83											
DW-119	09/25/84											
DW-121	10/03/83											
DW-121	10/24/83											
DW-121	11/12/83											
DW-121	09/25/84											
DW-134	05/02/84	0.0013			0.12			0.032				
DW-134	05/02/84	<0.005			0.112			<0.02				
DW-136	05/04/84	<0.005			1.04			80.4				
DW-136	05/04/84	0.0017			0.92			72.6				
DW-137	05/02/84	0.017			1.38			44.8				
DW-137	05/04/84	0.032			1.16			46.0				
DW-219	10/01/82				<.002			.016				
DW-220	10/01/82				<.002			.015				
DW-340	07/29/74											
DW-340	08/12/74											
DW-340	08/26/74											
DW-340	09/16/74											
DW-340	11/19/74											

NOTE: Units are mg/l unless otherwise noted. * = Micrograms/liter.

RI WELL NUMBER	SAMPLE DATE	METALS Iron Dissolved	Iron Total	Iron Tot. recov.	Lead Dissolved	Lead Total	Lead Tot. recov.	Manganese Dissolved	Manganese Total	Manganese Tot. recov.	Zinc Dissolved	Zinc Total	Zinc Tot. recov.
DW-114	11/12/83												
DW-114	09/25/84												
DW-115	10/03/83												
DW-115	10/24/83												
DW-115	11/12/83												
DW-115	09/25/84												
DW-116	10/20/82	3.24			.004			.68			4.53		
DW-116	04/27/83	5.5			<.005			.216			3.37		
DW-116	07/27/83	1.83			0.009			0.20			8.70		
DW-116	10/12/83	2.04			<.005			0.19			9.85		
DW-116	04/25/84	1.87			<.005			0.13			3.49		
DW-116	07/25/84	1.58			<0.005			0.122			4.46		
DW-116	07/24/85	1.43			<0.005			0.136			4.24		
DW-117	10/03/83												
DW-117	10/24/83												
DW-117	11/12/83												
DW-117	09/25/84												
DW-118	10/20/82	3.92			.013			3.67			.52		
DW-118	04/27/83	4.9			<.005			2.34			.59		
DW-118	07/27/83	2.95			<.005			2.15			0.503		
DW-118	10/12/83	1.88			<.005			1.49			10.8		
DW-118	04/25/84	4.01			<.005			2.68			0.798		
DW-118	07/25/84	4.29			<0.005			2.34			0.420		
DW-118	07/24/85	3.01			<0.005			1.81			0.384		
DW-119	10/03/83												
DW-119	10/24/83												
DW-119	11/12/83												
DW-119	09/25/84												
DW-121	10/03/83												
DW-121	10/24/83												
DW-121	11/12/83												
DW-121	09/25/84												
DW-134	05/02/84	0.025						33.6			10.9		
DW-134	05/02/84				<0.02						37.1		
DW-136	05/04/84				1.49						270		
DW-136	05/04/84	1.60						87.2			208		
DW-137	05/02/84				2.05						39.5		
DW-137	05/04/84	10.8						171			303		
DW-219	10/01/82	.010			<.04			.002			<.004		
DW-220	10/01/82	<.002			<.04			.001			<.004		
DW-340	07/29/74												
DW-340	08/12/74												
DW-340	08/26/74												
DW-340	09/16/74												
DW-340	11/19/74												

NOTE: Units are mg/l unless otherwise noted. * = Micrograms/liter.

RI WELL NUMBER	SAMPLE DATE	Total Dissolved Solids	PHOSPHATE Ortho-Phosphate	PHOSPHATE Total Phosphate	Flouride	Ammonia as N	Kjeldahl Nitrogen	REMARKS
DW-114	11/12/83							MEASURED FIELD PARAMETERS ONLY.
DW-114	09/25/84							MEASURED FIELD PARAMETERS ONLY.
DW-115	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-115	10/24/83							MEASURED FIELD PARAMETERS ONLY.
DW-115	11/12/83							MEASURED FIELD PARAMETERS ONLY.
DW-115	09/25/84							MEASURED FIELD PARAMETERS ONLY.
DW-116	10/20/82	2265			.6			
DW-116	04/27/83	2246			0.56			
DW-116	07/27/83	2255			0.60			
DW-116	10/12/83	2330			0.26			
DW-116	04/25/84	2258			0.31			
DW-116	07/25/84	2435						
DW-116	07/24/85	2490						
DW-117	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-117	10/24/83							MEASURED FIELD PARAMETERS ONLY.
DW-117	11/12/83							MEASURED FIELD PARAMETERS ONLY.
DW-117	09/25/84							MEASURED FIELD PARAMETERS ONLY.
DW-118	10/20/82	986			0.66			
DW-118	04/27/83	889			0.64			
DW-118	07/27/83	821			0.61			
DW-118	10/12/83	803			0.26			
DW-118	04/25/84	843			0.27			
DW-118	07/25/84	817						
DW-118	07/24/85	935						
DW-119	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-119	10/24/83							MEASURED FIELD PARAMETERS ONLY.
DW-119	11/12/83							MEASURED FIELD PARAMETERS ONLY.
DW-119	09/25/84							MEASURED FIELD PARAMETERS ONLY.
DW-121	10/03/83							MEASURED FIELD PARAMETERS ONLY.
DW-121	10/24/83							MEASURED FIELD PARAMETERS ONLY.
DW-121	11/12/83							MEASURED FIELD PARAMETERS ONLY.
DW-121	09/25/84							MEASURED FIELD PARAMETERS ONLY.
DW-134	05/02/84	900			1.5			SAMPLED BY MBMG
DW-134	05/02/84	950			2.07			
DW-136	05/04/84	1870			0.87			
DW-136	05/04/84	1384			2.7			ALSO SAMPLED BY INTRASEARCH
DW-137	05/02/84	2790			2.76			
DW-137	05/04/84	2220			2.3			ALSO SAMPLED BY INTRASEARCH
DW-219	10/01/82	830		1.3	.8			
DW-220	10/01/82	780		1.94	1.0			
DW-340	07/29/74							
DW-340	08/12/74							
DW-340	08/26/74							
DW-340	09/16/74							
DW-340	11/19/74							

NOTE: Units are mg/l unless otherwise noted.

RI WELL NUMBER	CROSS REFERENCE WELL NUMBER	LEGAL LOCATION	SAMPLE DATE	SAMPLER	SAMPLING METHOD	STATIC WATER LEVEL (ft. blw. MP)	PHYSICAL PARAMETERS Water Temperature (C)	pH Field	pH Lab	Specific Conductance Field	Specific Conductance Lab
DW-340	AMC #29	T05N R10W S36 CAC	01/22/75	AMC		8.8					
DW-340	AMC #29	T05N R10W S36 CAC	02/27/75	AMC		8.9					
DW-340	AMC #29	T05N R10W S36 CAC	03/18/75	AMC		8.4					
DW-340	AMC #29	T05N R10W S36 CAC	04/09/75	AMC		8.2					
DW-340	AMC #29	T05N R10W S36 CAC	05/27/75	AMC		8.3					
DW-340	AMC #29	T05N R10W S36 CAC	06/20/75	AMC		8.6					
DW-340	AMC #29	T05N R10W S36 CAC	07/22/75	AMC		8.3					
DW-340	AMC #29	T05N R10W S36 CAC	08/25/75	AMC		8.3					
DW-340	AMC #29	T05N R10W S36 CAC	09/25/75	AMC		8.9					
DW-340	AMC #29	T05N R10W S36 CAC	10/30/75	AMC		8.6					
DW-340	AMC #29	T05N R10W S36 CAC	11/19/75	AMC		8.5					
DW-340	AMC #29	T05N R10W S36 CAC	12/23/75	AMC		9.7					
DW-340	AMC #29	T05N R10W S36 CAC	01/28/76	AMC		9.6					
DW-340	AMC #29	T05N R10W S36 CAC	03/04/76	AMC		8.4					
DW-340	AMC #29	T05N R10W S36 CAC	04/29/76	AMC		8.2					
DW-340	AMC #29	T05N R10W S36 CAC	05/19/76	AMC		8.6					
DW-340	AMC #29	T05N R10W S36 CAC	06/05/76	AMC		8.6					
DW-340	AMC #29	T05N R10W S36 CAC	07/08/76	AMC		8.6					
DW-340	AMC #29	T05N R10W S36 CAC	09/29/76	AMC		8.7					
DW-340	AMC #29	T05N R10W S36 CAC	10/28/76	AMC		8.8					
DW-340	AMC #29	T05N R10W S36 CAC	11/17/76	AMC	PUMPED	8.4	9	6.8		2250	
DW-340	AMC #29	T05N R10W S36 CAC	12/09/76	AMC		8.6					
DW-340	AMC #29	T05N R10W S36 CAC	01/20/77	AMC	PUMPED	8.6	5	7.2		1700	
DW-340	AMC #29	T05N R10W S36 CAC	02/16/77	AMC		9.6					
DW-340	AMC #29	T05N R10W S36 CAC	03/17/77	AMC	PUMPED	9.4	5	7.1		1800	
DW-340	AMC #29	T05N R10W S36 CAC	05/19/77	AMC	PUMPED	8.8	7	7.3		2100	
DW-340	AMC #29	T05N R10W S36 CAC	07/20/77	AMC	PUMPED	8.9	9	7.4		1930	
DW-340	AMC #29	T05N R10W S36 CAC	09/22/77	AMC		8.6					
DW-340	AMC #29	T05N R10W S36 CAC	10/13/77	AMC	PUMPED	8.8	9	7.0		2500	
DW-340	AMC #29	T05N R10W S36 CAC	11/03/77	AMC	PUMPED	8.6	10	7.3		2600	
DW-340	AMC #29	T05N R10W S36 CAC	01/12/78	AMC	PUMPED	8.6	7	7.1		2200	
DW-340	AMC #29	T05N R10W S36 CAC	01/12/78	AMC	PUMPED	8.6	7	7.1		2200	
DW-340	AMC #29	T05N R10W S36 CAC	05/04/78	AMC	PUMPED	8.8	6	7.6		2900	
DW-340	AMC #29	T05N R10W S36 CAC	07/26/78	AMC	PUMPED	8.9	10			2600	
DW-340	AMC #29	T05N R10W S36 CAC	10/26/78	AMC	PUMPED	8.7					
DW-340	AMC #29	T05N R10W S36 CAC	02/21/79	AMC	PUMPED	8.3	8	6.59		2050	
DW-340	AMC #29	T05N R10W S36 CAC	04/12/79	AMC	PUMPED	8.3	8	7.04		2300	
DW-340	AMC #29	T05N R10W S36 CAC	07/26/79	AMC	PUMPED	8.8					
DW-340	AMC #29	T05N R10W S36 CAC	10/18/79	AMC	PUMPED	8.7	13	6.90		1600	
DW-340	AMC #29	T05N R10W S36 CAC	01/24/80	AMC	PUMPED	8.3	9	7.30			
DW-340	AMC #29	T05N R10W S36 CAC	04/16/80	AMC	PUMPED	8.4	8	7.05			
DW-340	AMC #29	T05N R10W S36 CAC	07/23/80	AMC	PUMPED	8.7	11	7.0			
DW-340	AMC #29	T05N R10W S36 CAC	09/15/82	AMC	PUMPED	9.0	10.5	6.3	7.1		3280
DW-340	AMC #29	T05N R10W S36 CAC	10/00/83	AMC				6.2		3380	
DW-401	AMC #28	T05N R10W S25 CCB	07/29/74	AMC		4.2					

NOTE: Units are mg/l unless otherwise noted.

COMMON IONS:

RI WELL NUMBER	SAMPLE DATE	Sulfate	Chloride	Nitrate as N	Total Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hardness as CaCO3	Calcium	Magnesium	Potassium	Sodium
DW-340	01/22/75											
DW-340	02/27/75											
DW-340	03/18/75											
DW-340	04/09/75											
DW-340	05/27/75											
DW-340	06/20/75											
DW-340	07/22/75											
DW-340	08/25/75											
DW-340	09/25/75											
DW-340	10/30/75											
DW-340	11/19/75											
DW-340	12/23/75											
DW-340	01/28/76											
DW-340	03/04/76											
DW-340	04/29/76											
DW-340	05/19/76											
DW-340	06/05/76											
DW-340	07/08/76											
DW-340	09/29/76											
DW-340	10/28/76											
DW-340	11/17/76	1590										
DW-340	12/09/76											
DW-340	01/20/77	1500										
DW-340	02/16/77											
DW-340	03/17/77	1500										
DW-340	05/19/77	910										
DW-340	07/20/77	1450			354	0	1740					
DW-340	09/22/77											
DW-340	10/13/77	1530					1760					
DW-340	11/03/77											
DW-340	01/12/78	1580										
DW-340	01/12/78	1580										
DW-340	05/04/78	1590										
DW-340	07/26/78	1650										
DW-340	10/26/78	1440										
DW-340	02/21/79	1710										
DW-340	04/12/79	1940										
DW-340	07/26/79	1700										
DW-340	10/18/79	1570										
DW-340	01/24/80	1630										
DW-340	04/16/80	2020										
DW-340	07/23/80											
DW-340	09/15/82	2420			293			666	181	14	23	
DW-340	10/00/83	2170			375							
DW-401	07/29/74											

NOTE: Units are mg/l unless otherwise noted.

METALS

RI WELL NUMBER	SAMPLE DATE	Arsenic Dissolved	Arsenic Total	Arsenic Total recov.	Cadmium Dissolved	Cadmium Total	Cadmium Total recov.	Copper Dissolved	Copper Total	Copper Total recov.	Mercury Dissolved	Mercury Total
DW-340	01/22/75											
DW-340	02/27/75											
DW-340	03/18/75											
DW-340	04/09/75											
DW-340	05/27/75											
DW-340	06/20/75											
DW-340	07/22/75											
DW-340	08/25/75											
DW-340	09/25/75											
DW-340	10/30/75											
DW-340	11/19/75											
DW-340	12/23/75											
DW-340	01/28/76											
DW-340	03/04/76											
DW-340	04/29/76											
DW-340	05/19/76											
DW-340	06/05/76											
DW-340	07/08/76											
DW-340	09/29/76											
DW-340	10/28/76											
DW-340	11/17/76	<10*			10*			80*			<0.2*	
DW-340	12/09/76											
DW-340	01/20/77	15*			100*			190*			<.02*	
DW-340	02/16/77											
DW-340	03/17/77	14*			100*			70*			<.02*	
DW-340	05/19/77	<10*			10*			70*			<.02*	
DW-340	07/20/77	29*			40*			440*			0.3*	
DW-340	09/22/77											
DW-340	10/13/77	<10*			<10*			80*			<.02*	
DW-340	11/03/77				<10*			70*				
DW-340	01/12/78	<10*			20*			130*				
DW-340	01/12/78	<10*			20*			130*			<.02*	
DW-340	05/04/78	<10*			10*			110*			<.02*	
DW-340	07/26/78	<10*			10*			40*			<.02*	
DW-340	10/26/78	16*			<10*			140*			<.02*	
DW-340	02/21/79	10*			20*			180*			<.02*	
DW-340	04/12/79	<10*			10*			50*			<.02*	
DW-340	07/26/79	12*			<10*			90*			0.4*	
DW-340	10/18/79	20*			10*			180*			1.7*	
DW-340	01/24/80	29*			10*			180*			0.3*	
DW-340	04/16/80	14*			20*			130*			<.02*	
DW-340	07/23/80											
DW-340	09/15/82	<.005			<.005			0.04			0.001	
DW-340	10/00/83	<0.005			<0.005			<0.02			<0.01	
DW-401	07/29/74											

NOTE: Units are mg/l unless otherwise noted. * = Micrograms/liter.

RI WELL NUMBER	SAMPLE DATE	METALS Iron Dissolved	Iron Total	Iron Tot. recov.	Lead Dissolved	Lead Total	Lead Tot. recov.	Manganese Dissolved	Manganese Total	Manganese Tot. recov.	Zinc Dissolved	Zinc Total	Zinc Tot. recov.
DW-340	01/22/75												
DW-340	02/27/75												
DW-340	03/18/75												
DW-340	04/09/75												
DW-340	05/27/75												
DW-340	06/20/75												
DW-340	07/22/75												
DW-340	08/25/75												
DW-340	09/25/75												
DW-340	10/30/75												
DW-340	11/19/75												
DW-340	12/23/75												
DW-340	01/28/76												
DW-340	03/04/76												
DW-340	04/29/76												
DW-340	05/19/76												
DW-340	06/05/76												
DW-340	07/08/76												
DW-340	09/29/76												
DW-340	10/28/76												
DW-340	11/17/76		6050*			20*						290*	
DW-340	12/09/76												
DW-340	01/20/77		31500*			20*			20500*			480*	
DW-340	02/16/77												
DW-340	03/17/77		1380*			<10*			14800*			320*	
DW-340	05/19/77		14000*			<10*			14600*			200*	
DW-340	07/20/77		100000*			20*			19500*			1200*	
DW-340	09/22/77												
DW-340	10/13/77		17200*			<10*			19200*			280*	
DW-340	11/03/77		18800*			<10*			18000*			210*	
DW-340	01/12/78		35900*			10*						380*	
DW-340	01/12/78		35900*			10*			19600*			380*	
DW-340	05/04/78		17500*			<10*			23100*			250*	
DW-340	07/26/78		17900*			110*			18100*			290*	
DW-340	10/26/78		41700*			<10*			6400*			650*	
DW-340	02/21/79		29000*			<10*			15600*			1200*	
DW-340	04/12/79		16000*			<10*			20700*			150*	
DW-340	07/26/79		30900*			<10*			22300*			320*	
DW-340	10/18/79		33000*			<10*			16000*			630*	
DW-340	01/24/80		81500*			<10*			13000*			1230*	
DW-340	04/16/80		41500*			<10*			25500*			350*	
DW-340	07/23/80												
DW-340	09/15/82		4.53			<.02			24.4			0.11	
DW-340	10/00/83		12			<0.02			40			<0.02	
DW-401	07/29/74												

NOTE: Units are mg/l unless otherwise noted. * = Micrograms/liter.

RI WELL NUMBER	SAMPLE DATE	Total Dissolved Solids	PHOSPHATE Ortho-Phosphate	PHOSPHATE Total Phosphate	Flouride	Ammonia as N	Kjeldahl Nitrogen	REMARKS
DW-340	01/22/75							
DW-340	02/27/75							
DW-340	03/18/75							
DW-340	04/09/75							
DW-340	05/27/75							
DW-340	06/20/75							
DW-340	07/22/75							
DW-340	08/25/75							
DW-340	09/25/75							
DW-340	10/30/75							
DW-340	11/19/75							
DW-340	12/23/75							
DW-340	01/28/76							
DW-340	03/04/76							
DW-340	04/29/76							
DW-340	05/19/76							
DW-340	06/05/76							
DW-340	07/08/76							
DW-340	09/29/76							
DW-340	10/28/76							
DW-340	11/17/76	2484						
DW-340	12/09/76							
DW-340	01/20/77	2496						
DW-340	02/16/77							
DW-340	03/17/77	2504						
DW-340	05/19/77	2612						
DW-340	07/20/77	2528						
DW-340	09/22/77							
DW-340	10/13/77	2620				0.12	0.22	
DW-340	11/03/77					0.28		
DW-340	01/12/78	2594						
DW-340	01/12/78	2594						
DW-340	05/04/78	2742						
DW-340	07/26/78	2572						
DW-340	10/26/78	2374						
DW-340	02/21/79	2610						
DW-340	04/12/79	2994						
DW-340	07/26/79	2910						
DW-340	10/18/79	2658				0.17	0.61	
DW-340	01/24/80	2592						
DW-340	04/16/80	3296						
DW-340	07/23/80							
DW-340	09/15/82	3580						
DW-340	10/00/83	3490						
DW-401	07/29/74							

NOTE: Units are mg/l unless otherwise noted.

RI WELL NUMBER	CROSS REFERENCE WELL NUMBER	LEGAL LOCATION	SAMPLE DATE	SAMPLER	SAMPLING METHOD	PHYSICAL PARAMETERS STATIC WATER LEVEL (ft. blw. MP)	Water Temperature (C)	pH Field	pH Lab	Specific Conductance Field	Specific Conductance Lab
DW-401	AMC #28	T05N R10W S25 CCB	08/12/74	AMC		4.2					
DW-401	AMC #28	T05N R10W S25 CCB	09/16/74	AMC		4.7					
DW-401	AMC #28	T05N R10W S25 CCB	10/19/74	AMC		4.8					
DW-401	AMC #28	T05N R10W S25 CCB	01/22/75	AMC		4.6					
DW-401	AMC #28	T05N R10W S25 CCB	02/27/75	AMC		4.7					
DW-401	AMC #28	T05N R10W S25 CCB	03/18/75	AMC		4.5					
DW-401	AMC #28	T05N R10W S25 CCB	04/09/75	AMC		4.6					
DW-401	AMC #28	T05N R10W S25 CCB	05/27/75	AMC		5.7					
DW-401	AMC #28	T05N R10W S25 CCB	06/20/75	AMC		4.5					
DW-401	AMC #28	T05N R10W S25 CCB	07/22/75	AMC		4.5					
DW-401	AMC #28	T05N R10W S25 CCB	08/25/75	AMC		4.2					
DW-401	AMC #28	T05N R10W S25 CCB	09/25/75	AMC		4.6					
DW-401	AMC #28	T05N R10W S25 CCB	10/30/75	AMC		4.6					
DW-401	AMC #28	T05N R10W S25 CCB	11/19/75	AMC		4.7					
DW-401	AMC #28	T05N R10W S25 CCB	12/23/75	AMC		4.8					
DW-401	AMC #28	T05N R10W S25 CCB	01/28/76	AMC		4.9					
DW-401	AMC #28	T05N R10W S25 CCB	03/04/76	AMC		4.9					
DW-401	AMC #28	T05N R10W S25 CCB	04/29/76	AMC		4.7					
DW-401	AMC #28	T05N R10W S25 CCB	05/19/76	AMC		4.9					
DW-401	AMC #28	T05N R10W S25 CCB	06/05/76	AMC		4.8					
DW-401	AMC #28	T05N R10W S25 CCB	07/08/76	AMC		4.9					
DW-401	AMC #28	T05N R10W S25 CCB	09/29/76	AMC		4.9					
DW-401	AMC #28	T05N R10W S25 CCB	10/28/76	AMC		4.9					
DW-401	AMC #28	T05N R10W S25 CCB	11/17/76	AMC	PUMPED	4.8	7		7.2	2750	
DW-401	AMC #28	T05N R10W S25 CCB	12/09/76	AMC		4.8					
DW-401	AMC #28	T05N R10W S25 CCB	01/20/77	AMC	PUMPED	4.9	6		6.9	2900	
DW-401	AMC #28	T05N R10W S25 CCB	02/16/77	AMC		4.9					
DW-401	AMC #28	T05N R10W S25 CCB	03/17/77	AMC	PUMPED	6.4	6		6.9	3000	
DW-401	AMC #28	T05N R10W S25 CCB	05/18/77	AMC	PUMPED	7.0	7		7.0	2700	
DW-401	AMC #28	T05N R10W S25 CCB	07/20/77	AMC	PUMPED	7.2	10		6.8	3400	
DW-401	AMC #28	T05N R10W S25 CCB	09/22/77	AMC	PUMPED	6.9					
DW-401	AMC #28	T05N R10W S25 CCB	10/13/77	AMC	PUMPED	7.0	10		7.0	2850	
DW-401	AMC #28	T05N R10W S25 CCB	11/03/77	AMC	PUMPED	7.0	9		6.9	3100	
DW-401	AMC #28	T05N R10W S25 CCB	01/12/78	AMC	PUMPED	7.9	9		6.8	2600	
DW-401	AMC #28	T05N R10W S25 CCB	05/04/78	AMC	PUMPED	6.9	8		7.1	2950	
DW-401	AMC #28	T05N R10W S25 CCB	07/26/78	AMC	PUMPED	6.9	12			2800	
DW-401	AMC #28	T05N R10W S25 CCB	10/26/78	AMC	PUMPED	6.6					
DW-401	AMC #28	T05N R10W S25 CCB	02/21/79	AMC	PUMPED	6.6	8		6.30	2800	
DW-401	AMC #28	T05N R10W S25 CCB	04/12/79	AMC	PUMPED	6.7	7		6.77	3000	
DW-401	AMC #28	T05N R10W S25 CCB	07/26/79	AMC	PUMPED	7.0					
DW-401	AMC #28	T05N R10W S25 CCB	10/11/79	AMC	PUMPED	7.0					
DW-401	AMC #28	T05N R10W S25 CCB	10/18/79	AMC	PUMPED		13		6.58	1850	
DW-401	AMC #28	T05N R10W S25 CCB	01/24/80	AMC	PUMPED	6.9	11		6.84		
DW-401	AMC #28	T05N R10W S25 CCB	04/16/80	AMC	PUMPED	6.9	8		6.80		
DW-401	AMC #28	T05N R10W S25 CCB	07/23/80	AMC	PUMPED	6.9	10				

NOTE: Units are mg/l unless otherwise noted.

COMMON IONS:

RI WELL NUMBER	SAMPLE DATE	Sulfate	Chloride	Nitrate as N	Total Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hardness as CaCO3	Calcium	Magnesium	Potassium	Sodium
DW-401	08/12/74											
DW-401	09/16/74											
DW-401	10/19/74											
DW-401	01/22/75											
DW-401	02/27/75											
DW-401	03/18/75											
DW-401	04/09/75											
DW-401	05/27/75											
DW-401	06/20/75											
DW-401	07/22/75											
DW-401	08/25/75											
DW-401	09/25/75											
DW-401	10/30/75											
DW-401	11/19/75											
DW-401	12/23/75											
DW-401	01/28/76											
DW-401	03/04/76											
DW-401	04/29/76											
DW-401	05/19/76											
DW-401	06/05/76											
DW-401	07/08/76											
DW-401	09/29/76											
DW-401	10/28/76											
DW-401	11/17/76	1950										
DW-401	12/09/76											
DW-401	01/20/77	1840										
DW-401	02/16/77											
DW-401	03/17/77	1730										
DW-401	05/18/77	1840										
DW-401	07/20/77	1900				378	0	2200	1740			
DW-401	09/22/77											
DW-401	10/13/77	1800						2240	1780			
DW-401	11/03/77											
DW-401	01/12/78	1890										
DW-401	05/04/78	1840										
DW-401	07/26/78	2000										
DW-401	10/26/78	1850										
DW-401	02/21/79	2160										
DW-401	04/12/79	2400										
DW-401	07/26/79	1960										
DW-401	10/11/79											
DW-401	10/18/79	2110										
DW-401	01/24/80	2050										
DW-401	04/16/80	1970										
DW-401	07/23/80											

NOTE: Units are mg/l unless otherwise noted.

METALS

RI WELL NUMBER	SAMPLE DATE	Arsenic Dissolved	Arsenic Total	Arsenic Total recov.	Cadmium Dissolved	Cadmium Total	Cadmium Total recov.	Copper Dissolved	Copper Total	Copper Total recov.	Mercury Dissolved	Mercury Total
DW-401	08/12/74											
DW-401	09/16/74											
DW-401	10/19/74											
DW-401	01/22/75											
DW-401	02/27/75											
DW-401	03/18/75											
DW-401	04/09/75											
DW-401	05/27/75											
DW-401	06/20/75											
DW-401	07/22/75											
DW-401	08/25/75											
DW-401	09/25/75											
DW-401	10/30/75											
DW-401	11/19/75											
DW-401	12/23/75											
DW-401	01/28/76											
DW-401	03/04/76											
DW-401	04/29/76											
DW-401	05/19/76											
DW-401	06/05/76											
DW-401	07/08/76											
DW-401	09/29/76											
DW-401	10/28/76											
DW-401	11/17/76	<10*			10*			10*			<.02*	
DW-401	12/09/76											
DW-401	01/20/77	10*			10*			30*			<0.2*	
DW-401	02/16/77											
DW-401	03/17/77	<10*			<10*			30*			<0.2*	
DW-401	05/18/77	11*			<10*			40*			<.02*	
DW-401	07/20/77	<10*			<10*			30*			<.02*	
DW-401	09/22/77											
DW-401	10/13/77	<10*			<10*			20*			<0.2*	
DW-401	11/03/77				<10*			30*				
DW-401	01/12/78	<10*			10*			30*			<0.2*	
DW-401	05/04/78	<10*			10*			80*			<0.2*	
DW-401	07/26/78	11*			10*			20*			<0.2*	
DW-401	10/26/78	<10*			10*			30*			<0.2*	
DW-401	02/21/79	17*			20*			30*			<0.2*	
DW-401	04/12/79	15*			10*			20*			<0.2*	
DW-401	07/26/79	21*			380*			350*			<0.2*	
DW-401	10/11/79											
DW-401	10/18/79	11*			20*			50*			<0.2*	
DW-401	01/24/80	14*			10*			50*			<0.2*	
DW-401	04/16/80	21*			20*			70*			<0.2*	
DW-401	07/23/80											

NOTE: Units are mg/l unless otherwise noted. * = Micrograms/liter.

RI WELL NUMBER	SAMPLE DATE	METALS Iron Dissolved	Iron Total	Iron Tot. recov.	Lead Dissolved	Lead Total	Lead Tot. recov.	Manganese Dissolved	Manganese Total	Manganese Tot. recov.	Zinc Dissolved	Zinc Total	Zinc Tot. recov.
DW-401	08/12/74												
DW-401	09/16/74												
DW-401	10/19/74												
DW-401	01/22/75												
DW-401	02/27/75												
DW-401	03/18/75												
DW-401	04/09/75												
DW-401	05/27/75												
DW-401	06/20/75												
DW-401	07/22/75												
DW-401	08/25/75												
DW-401	09/25/75												
DW-401	10/30/75												
DW-401	11/19/75												
DW-401	12/23/75												
DW-401	01/28/76												
DW-401	03/04/76												
DW-401	04/29/76												
DW-401	05/19/76												
DW-401	06/05/76												
DW-401	07/08/76												
DW-401	09/29/76												
DW-401	10/28/76												
DW-401	11/17/76		6300*			<10*			15200*			70*	
DW-401	12/09/76												
DW-401	01/20/77		6300*			20*			14600*			70*	
DW-401	02/16/77												
DW-401	03/17/77		7900*			<10*			13900*			70*	
DW-401	05/18/77		11600*			<10*			14300*			80*	
DW-401	07/20/77		9750*			<10*			16000*			50*	
DW-401	09/22/77												
DW-401	10/13/77		8800*			<10*			15400*			15400*	
DW-401	11/03/77		8400*			<10*			16100*			40*	
DW-401	01/12/78		9800*			<10*			15200*			40*	
DW-401	05/04/78		8300*			<10*			18500*			70*	
DW-401	07/26/78		12400*			70*			19600*			60*	
DW-401	10/26/78		21100*			<10*			17100*			140*	
DW-401	02/21/79		9500*			<10*			21500*			40*	
DW-401	04/12/79		11800*			<10*			25300*			40*	
DW-401	07/26/79		44300*			<10*			116000			3870*	
DW-401	10/11/79												
DW-401	10/18/79		42000*			<10*			97000*			200*	
DW-401	01/24/80		31200*			<10*			69000			190*	
DW-401	04/16/80		27100*			<10*			50500*			170*	
DW-401	07/23/80												

NOTE: Units are mg/l unless otherwise noted. * = Micrograms/liter.

RI WELL NUMBER	SAMPLE DATE	Total Dissolved Solids	PHOSPHATE Ortho-Phosphate	PHOSPHATE Total Phosphate	Flouride	Ammonia as N	Kjeldahl Nitrogen	REMARKS
DW-401	08/12/74							
DW-401	09/16/74							
DW-401	10/19/74							
DW-401	01/22/75							
DW-401	02/27/75							
DW-401	03/18/75							
DW-401	04/09/75							
DW-401	05/27/75							
DW-401	06/20/75							
DW-401	07/22/75							
DW-401	08/25/75							
DW-401	09/25/75							
DW-401	10/30/75							
DW-401	11/19/75							
DW-401	12/23/75							
DW-401	01/28/76							
DW-401	03/04/76							
DW-401	04/29/76							
DW-401	05/19/76							
DW-401	06/05/76							
DW-401	07/08/76							
DW-401	09/29/76							
DW-401	10/28/76							
DW-401	11/17/76	3110						
DW-401	12/09/76							
DW-401	01/20/77	3146						
DW-401	02/16/77							
DW-401	03/17/77	7900						
DW-401	05/18/77	3300						
DW-401	07/20/77	3238						
DW-401	09/22/77							
DW-401	10/13/77	3276				0.25	0.50	
DW-401	11/03/77							
DW-401	01/12/78	3338						
DW-401	05/04/78	3292						
DW-401	07/26/78	3186						
DW-401	10/26/78	3182						
DW-401	02/21/79	3458						
DW-401	04/12/79	3954						
DW-401	07/26/79	3940						
DW-401	10/11/79							
DW-401	10/18/79	3652				0.63	1.59	
DW-401	01/24/80	3268						
DW-401	04/16/80	3440						
DW-401	07/23/80							

NOTE: Units are mg/l unless otherwise noted.

RI WELL NUMBER	CROSS REFERENCE WELL NUMBER	LEGAL LOCATION	SAMPLE DATE	SAMPLER	SAMPLING METHOD	PHYSICAL PARAMETERS: STATIC WATER LEVEL (ft. blw. MP)	Water Temperature (C)	pH Field	pH Lab	Specific Conductance Field	Specific Conductance Lab
DW-401	AMC #28	T05N R10W S25 CCB	09/15/82	AMC	PUMPED	6.4		6.7		3000	
DW-401	AMC #28	T05N R10W S25 CCB	10/00/83	AMC				6.3		3150	
DW-408	AMC #2	T05N R09W S20 BABA	02/28/73	AMC	PUMPED			8.11		432.0	

NOTE: Units are mg/l unless otherwise noted.

COMMON IONS:

RI WELL NUMBER	SAMPLE DATE	Sulfate	Chloride	Nitrate as N	Total Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hardness as CaCO3	Calcium	Magnesium	Potassium	Sodium
DW-401	09/15/82	2010	11			355		621				23
DW-401	10/00/83	2660				361			718	156		24
DW-408	02/28/73	56				186	0		58	17.5	4.85	

NOTE: Units are mg/l unless otherwise noted.

RI WELL NUMBER	SAMPLE DATE	METALS											
		Arsenic			Cadmium			Copper			Mercury		
		Dissolved	Total	Total recov.	Dissolved	Total	Total recov.	Dissolved	Total	Total recov.	Dissolved	Total	
DW-401	09/15/82		0.016			<0.005			0.04			<0.001	
DW-401	10/00/83		0.007			<0.005			<0.02			<0.001	
DW-408	02/28/73									<.01			

NOTE: Units are mg/l unless otherwise noted. * = Micrograms/liter.

RI WELL NUMBER	SAMPLE DATE	METALS Iron Dissolved	Iron Total	Iron Tot. recov.	Lead Dissolved	Lead Total	Lead Tot. recov.	Manganese Dissolved	Manganese Total	Manganese Tot. recov.	Zinc Dissolved	Zinc Total	Zinc Tot. recov.
DW-401	09/15/82		18.6			<0.02			16.1			0.05	
DW-401	10/00/83		29			<0.02			29			0.08	
DW-408	02/28/73		.50				<.10	0.0					.02

NOTE: Units are mg/l unless otherwise noted. * = Micrograms/liter.

RI WELL NUMBER	SAMPLE DATE	Total Dissolved Solids	PHOSPHATE Ortho-Phosphate	PHOSPHATE Total Phosphate	Flouride	Ammonia as N	Kjeldahl Nitrogen	REMARKS
DW-401	09/15/82	3160						
DW-401	10/00/83	3210						
DW-408	02/28/73	354.5	1.8					

NOTE: Units are mg/l unless otherwise noted.

DRAFT

ATTACHMENT I-B
COLORADO TAILINGS GROUND-WATER AND SOLIDS DATA

WELL NUMBER	LEGAL LOCATION	SAMPLER/ AGENCY	SAMPLE DATE	SAMPLE TIME	LABORATORY	LAB NUMBER	SAMPLING METHOD	FORMATION	PHYSICAL PARAMETERS Water Temperature (C)	Field pH (S.U.)	QUESTIONABLE DATA
91 01D		NEIC	10/00/78				BAILED				YES
95 01D		NEIC	10/00/78				BAILED				YES
CT-01		HYDROMETRI	05/27/82		ENERGY			TAILINGS		5.6	
CT-02		HYDROMETRI	05/27/82		ENERGY			TAILINGS		3.2	
CT-03		HYDROMETRI	05/27/82		ENERGY					2.7	YES
CT-04		HYDROMETRI	05/27/82		ENERGY			TAILINGS		2.9	
CT-84-1		INTRASEARC	05/02/84		NORTHERN	73043		ALLUVIUM		6.9	YES
CT-84-1	T03N R08W S23 DABD	MBMG	05/02/84	13:20	MBMG	B4Q0110	BAILED	ALLUVIUM	8.2	6.12	YES
CT-84-10		INTRASEARC	04/27/84		NORTHERN	72934		TAILINGS		5.4	
CT-84-2		INTRASEARC	05/04/84		NORTHERN	73044		ALLUVIUM		4.9	YES
CT-84-2	T03N R08W S23 CBBB	MBMG	05/04/84	13:44	MBMG	B4Q0115	PUMPED	ALLUVIUM	7.5	5.24	YES
CT-84-3		INTRASEARC	05/02/84		NORTHERN	73045		TAILINGS?		6.1	
CT-84-3	T03N R08W S23 CBBB	MBMG	05/04/84	14:11	MBMG	84Q0116	PUMPED	TAILINGS?	7.3	5.85	
CT-84-4		INTRASEARC	04/27/84		NORTHERN	72932		ALLUVIUM		5.9	YES
CT-84-5		INTRASEARC	05/02/84		NORTHERN	73046		ALLUVIUM		7.8	YES
CT-84-5	T03N R08W S23 DBDA	MBMG	05/02/84	11:30	MBMG	B4Q0111	BAILED	ALLUVIUM	9.0	6.53	YES
CT-84-8		INTRASEARC	04/27/84		NORTHERN	72933		ALLUVIUM		4.6	YES
CT-84-8AP	T03N R08W S23 DBBB	MBMG	05/02/84	15:00	MBMG	B4Q0112	BAILED	ALLUVIUM	5.2	5.15	YES
CT-84-8AP		INTRASEARC	NONE GIVEN		NORTHERN	73047		ALLUVIUM		2.9	YES
NC-1	T03N R08W S23 DBBB	MBMG*TED	11/04/82	12:30	MBMG	B2Q1107	PUMPED	ALLUVIUM	7.9	5.32	YES
NC-1	T03N R08W S23 DBBB	MBMG*HRM	04/22/83	10:00	MBMG	83Q0161	PUMPED	ALLUVIUM	3.2	3.89	YES
NE-2	T03N R08W S23 ACDD	MBMG*TED	11/11/82	15:20	MBMG	82Q1124	BAILED	ALLUVIUM	4.7	7.24	YES
NE-2	T03N R08W S23 ACDD	MBMG*HRM	04/22/83	16:50	MBMG	83Q0164	PUMPED	ALLUVIUM	8.3	6.56	YES
NW-1	T03N R08W S23 BDBB	MBMG*TED	11/04/82	13:50	MBMG	82Q1108	PUMPED	ALLUVIUM?	9	3.48	YES
NW-1	T03N R08W S23 BDDC	MBMG*HRM	04/23/83		MBMG	83Q0165	PUMPED	ALLUVIUM?	10	3.97	YES
NW-1	T03N R08W S23 BDBB	MBMG	07/18/84	12:15	MBMG	B4Q0584	PUMPED	ALLUVIUM?	11.0	3.76	YES
NW-2	T03N R08W S23 BDBB	MBMG*TED	11/04/82	14:30	MBMG	B2Q1109	PUMPED	TAILINGS	8.2	3.88	
NW-2	T03N R08W S23 BDDC	MBMG*HRM	04/23/83		MBMG	B3Q0166	PUMPED	TAILINGS	12	3.61	
NW-2	T03N R08W S23 BDBB	MBMG	07/18/84	13:30	MBMG	84Q0585	PUMPED	TAILINGS	11.0	3.25	
NW-2	T03N R08W S23 BDBB	MBMG	11/05/85	10:30	MBMG	B5Q1206	BAILED	TAILINGS	6.6	3.1	
NW-3	T03N R08W S23 BDCD	BSB*RL	01/26/83	10:15	MBMG	B3Q0031	PUMPED	ALLUVIUM?	5	6.91	YES
NW-4	T03N R08W S23 BDDC	MBMG*HRM	04/22/83	08:30	MBMG	83Q0167	PUMPED	ALLUVIUM	5.9	3.75	YES
S-1	T03N R08W S23 DDAA	MBMG*HRM	04/23/83	11:00	MBMG	B3Q0174	PUMPED	ALLUVIUM	9.5	7.05	YES
S-2	T03N R08W S23 DBCA	MBMG*HRM	11/13/82		MBMG	82Q1126	PUMPED	DECOMPOSED	3.0	6.3	YES
S-2	T03N R08W S23 DBCA	MBMG*HRM	04/23/83	09:30	MBMG	83Q0168	PUMPED	DECOMPOSED	11	6.89	YES
S-3	T03N R08W S23 DACB	MBMG*TED	11/09/82	14:45	MBMG	82Q1114	PUMPED	DECOMPOSED	6.5	6.80	YES
S-3	T03N R08W S23 DACB	MBMG*HRM	04/22/83	14:30	MBMG	83Q0169	PUMPED	DECOMPOSED	3.5	6.70	YES
S-4	T03N R08W S23 DACB	MBMG*TED	11/09/82	15:45	MBMG	B2Q1115	PUMPED	TAILINGS	7.2	6.67	
S-4	T03N R08W S23 DACB	MBMG*HRM	04/22/83	16:00	MBMG	3Q0170	PUMPED	TAILINGS	3	6.78	
SW-1	T03N R08W S23 CAAB	MBMG*HRM	11/13/82		MBMG	B2Q1127	PUMPED	ALLUVIUM?	3.9	6.26	YES
SW-1	T03N R08W S23 CAAB	MBMG	07/19/84	11:20	MBMG	84Q0586	PUMPED	ALLUVIUM?	14.5	6.32	YES
SW-1A	T03N R08W S23 CAAB	MBMG	07/20/84	11:15	MBMG	B4Q0587	PUMPED	ALLUVIUM?	12	6.6	YES
SW-2	T03N R08W S23 CAAB	MBMG*HRM	11/13/82		MBMG	82Q1128	PUMPED	TAILINGS?	4.2	6.55	
SW-2	T03N R08W S23 CAAB	MBMG	07/20/84	08:20	MBMG	B4Q0588	PUMPED	TAILINGS?	15.5	6.68	
SW-3	T03N R08W S23 BDCD	MBMG*HRM	04/23/83		MBMG	83Q0171	PUMPED	DECOMPOSED	8.5	3.53	YES

COMMON IONS:

WELL NUMBER	SAMPLE DATE	Specific Conductance (umhos/cm)	Total Dissolved Solids	Calcium	Magnesium	Potassium	Sodium	Sulfate	Chloride	Fluoride	Nitrate as N	Bicarbonate
91 01D	10/00/78											
95 01D	10/00/78											
CT-01	05/27/82	1570										
CT-02	05/27/82	1210										
CT-03	05/27/82	2280										
CT-04	05/27/82	2390										
CT-84-1	05/02/84	1240	950	155	34	13	98	560	25	2.07	0.71 (1)	122
CT-84-1	05/02/84	1201 (1)	900	135	29.9	12.1	52.7	510	22.1	1.5	0.82	135.7
CT-84-10	04/27/84	1390	1230	100	32	7	183	796	19	0.71	<0.05 (1)	12
CT-84-2	05/04/84	1770	1870	134	45	7	447	766	50	0.87	1.30 (1)	0
CT-84-2	05/04/84	1717.6 (1)	1384	118	34.3	7.8	33.5	1030	22.7	2.7	0.55	12.2
CT-84-3	05/02/84	2370	2790	302	67	13	545	1680	26	2.76	1.28 (1)	34
CT-84-3	05/04/84	2410 (1)	2220	247	45.6	12.7	35.3	1620	24.3	2.3	0.59	26.0
CT-84-4	04/27/84	1210	920	140	31	12	144	528	186	2.34	1.32 (1)	173
CT-84-5	05/02/84	1100	914	176	34	5	68	282	40	0.55	20.0 (1)	266
CT-84-5	05/02/84	1162.6 (1)	729	146	34.1	5.3	64.1	249	40.8	0.6	24.9	286.5
CT-84-8	04/27/84	2090	1950	212	46	9	386	1,240	37	1.21	<0.05 (1)	0
CT-84-8AP	05/02/84	1867 (1)	1686	188	38.6	6.2	88.8	1150	28.4	1.2	0.05	3.4
CT-84-8AP	NONE GIVEN	2040	1750	260	42	7	238	1180	31	1.16	1.20 (1)	0
NC-1	11/04/82	2232.1 (1)		220	40.6	7.2	117	1310	29.0	1.9	0.07	
NC-1	04/22/83	2038 (1)		186	37.9	6.4	100	1130.	27.9	1.4	0.042	
NE-2	11/11/82	1233.3 (1)	855.38	124	31.2	6.8	101	418	29.5	2.4	7.82	204
NE-2	04/22/83	1409 (1)		127	31.8	5	121	480	44	1.1	15.1	
NW-1	11/04/82	3581.5 (1)		344.47	107	11.9	121	2430	40.8	3.4	0.20	
NW-1	04/23/83	3267 (1)		299	91.3	9.3	108	1890	40.4	1.9	7.4	0
NW-1	07/18/84	2929 (1)		251	64.9	9.8	106	2040	35.3	0.2	0.01	0
NW-2	11/04/82	3347.1 (1)		282	71.4	10.8	107	2270	24.3	4.1	0.40	
NW-2	04/23/83	2714 (1)		202	41.9	5.8	85.6	1630	27.4	1.2	0.041	0
NW-2	07/18/84	2647 (1)		180	43.9	7.8	88.9	1890	29.6	0.1	0.03	0
NW-2	11/05/85	2821 (1)		198	39.4	8.1	104	1600	30.8	1.8	0.03	0
NW-3	01/26/83	1471 (1)	1074	193	52.0	6.5	88.8	510	55	1.7	16.9	263
NW-4	04/22/83	2955 (1)		237	61.4	10.1	105	2050	37	3.1	0.02	0
S-1	04/23/83	1017 (1)	647.35	129	31.1	4.6	53.1	206	33.5	0.48	22.6	286
S-2	11/13/82	593.4 (1)	221.36	32.9	7.4	2.9	22.4	55.7	8.1	0.4	0.89	154.2
S-2	04/23/83	1371 (1)	878.03	130	28.3	5.5	129	325	46.0	1.1	18	358
S-3	11/09/82	1097 (1)	715.71	136	31.1	5.7	58.3	286	31.0	0.5	9.16	264
S-3	04/22/83	1049 (1)	691.62	128	30.4	4.8	56.1	263	35	0.43	16.8	269
S-4	11/09/82	1069 (1)	738.74	133	30.2	6.2	59.0	316	20.9	0.8	4.25	270.4
S-4	04/22/83	1042 (1)	711.60	115	28.2	5.2	56.3	325	18.5	0.9	3.52	262
SW-1	11/13/82	497.6 (1)	332.86	54.4	12.7	3.0	24.3	157	9.8	0.5	1.38	79.3
SW-1	07/19/84	533 (1)	361	65	14.8	3.1	22.6	176	8.1	0.5	1.29	91.1
SW-1A	07/20/84	455 (1)	381	64.1	15	3.4	23.2	177	9.8	0.7	1.34	127.1
SW-2	11/13/82	486.4 (1)	332.79	55.2	12.5	2.4	24.2	157	8.7	0.4	0.60	90.5
SW-2	07/20/84	538 (1)	386	64.6	14.5	2.5	24	187	8.1	0.6	0.39	92.2
SW-3	04/23/83	2256 (1)		187	42.6	4.9	77.8	1130	52.9	1.5	12.5	0

NOTE: Units are mg/l unless other wise noted.
(1) Lab measurement.
(2) Nitrate plus nitrite as N.
Sample locations shown on Figure 2-3.

WELL NUMBER	SAMPLE DATE	CATION/ANION BALANCE Total Cations (meq/l)	Total Anions (meq/l)	Percent Difference	METALS: Aluminum Dissolved	Arsenic Dissolved	Barium Dissolved	Boron Dissolved	Cadmium Dissolved	Chromium Dissolved	Copper Dissolved	Iron Dissolved
91 01D	10/00/78					4.4			0.17		0.27	97
95 01D	10/00/78					11			0.67		130	190
CT-01	05/27/82										31.5 (2)	92.1 (2)
CT-02	05/27/82										13.1 (2)	60.7 (2)
CT-03	05/27/82										52.4 (2)	190 (2)
CT-04	05/27/82										45.6 (2)	152 (2)
CT-84-1	05/02/84	16.3	14.8	9.6	0.1	<0.005		0.3	0.112	0.04	<0.02	
CT-84-1	05/02/84	12.2	14.0	-13.7	0.060	0.0013		0.22	0.12	0.011	0.032	0.025
CT-84-10	04/27/84	18.4	17.4	5.6	0.5	0.035	<0.1	<0.1	0.143	0.06	10.5	19.8
CT-84-2	05/04/84	38.3			6.1	<0.005		0.3	1.04	0.05	80.4	
CT-84-2	05/04/84	16.8	22.3	-28.1	5.3	0.0017		0.26	0.92	0.039	72.6	1.60
CT-84-3	05/02/84	45.9	36.4	23.1	1.4	0.017		0.4	1.38	0.05	44.8	
CT-84-3	05/04/84	27.6	35.0	-23.6	1.44	0.032		0.31	1.16	0.078	46.0	10.8
CT-84-4	04/27/84	17.6	19.7	-11.3	0.3	0.005	<0.1	0.2	0.109	0.04	0.08	0.15
CT-84-5	05/02/84	14.7	12.3	17.8	0.1	0.027		<0.1	<0.005	<0.05	<0.02	
CT-84-5	05/02/84	13.0	12.1	7.2	<0.030	0.016		0.12	<0.002	<0.002	0.042	<0.002
CT-84-8	04/27/84	41.8			0.9	0.067	<0.1	<0.1	0.19	0.05	7.26	188
CT-84-8AP	05/02/84	22.7	24.8	-8.8	2.5	0.768		0.10	0.31	0.008	20.3	99.2
CT-84-8AP	NONE GIVEN	30.3			2.8	0.53		0.2	0.368	0.05	20.5	
NC-1	11/04/82	24.5			1.42			0.15	0.28	0.027	16.5	60.8
NC-1	04/22/83	22.0			2.940	0.0075		0.150	0.240	0.013	24.9	67.2
NE-2	11/11/82	13.4	13.6	-1.5	0.21			0.18	0.003	<0.002	0.046	0.26
NE-2	04/22/83	14.4			<0.030	0.0091		0.250	<0.002	<0.002	0.040	0.028
NW-1	11/04/82	45.7			16.4			0.16	0.57	0.058	52.7	251
NW-1	04/23/83	37.5			7.040	0.028		0.090	0.360	0.024	31.6	175
NW-1	07/18/84	37.4			13.5	0.184		0.15	0.64	0.035	78.0	248
NW-2	11/04/82	43.8			16.3			0.16	0.66	0.045	53.4	343
NW-2	04/23/83	28.3			13.0	0.084		0.150	0.360	0.030	65.1	168
NW-2	07/18/84	27.4			13.2	0.151		0.11	0.45	0.032	58.4	183
NW-2	11/05/85	21.8			14.2	0.26		0.25	0.39	0.18	45.6	0.185
NW-3	01/26/83	18.0	17.4	3.4	0.09			0.19	0.02	0.10	0.066	0.035
NW-4	04/22/83	36.6			19.6	0.0018		0.180	0.470	0.027	70.5	277
S-1	04/23/83	11.5	10.9	5.4	<0.030	0.0068		0.110	<0.002	<0.002	0.034	0.060
S-2	11/13/82	3.3	4.5	-30.8	0.05			0.08	0.004	<0.002	0.053	0.099
S-2	04/23/83	14.7	15.2	-3.3	<0.030	0.0049		0.370	0.008	<0.002	0.088	0.056
S-3	11/09/82	12.1	12.1	0.0	0.07			0.10	0.003	0.005	0.23	0.064
S-3	04/22/83	11.5	11.8	-2.6	<0.030	0.106		0.160	<0.002	<0.002	0.290	0.033
S-4	11/09/82	11.9	12.6	-5.7	0.06			0.10	0.004	0.004	0.36	0.016
S-4	04/22/83	10.7	12.5	-15.5	<0.030	0.280		0.170	<0.002	<0.002	0.440	0.025
SW-1	11/13/82	4.9	5.1	-4.0	0.11			0.08	0.004	0.006	0.22	0.059
SW-1	07/19/84	5.6	5.7	-1.8	<0.030	0.027		0.050	0.003	<0.002	0.24	0.14
SW-1A	07/20/84	5.6	6.5	-14.9	<0.030	0.224		0.060	0.002	<0.002	0.016	0.13
SW-2	11/13/82	4.9	5.3	-7.8	0.10			0.09	<0.002	0.005	0.038	0.31
SW-2	07/20/84	5.7	6.0	-5.1	<0.030	0.016		0.10	<0.002	<0.002	0.010	3.80
SW-3	04/23/83	21.6			8.330	0.780		0.110	0.200	0.013	37.6	82.2

NOTE: Units are mg/l unless otherwise noted.
(2) Total recoverable analysis.
Sample locations shown on Figure 2-3.

METALS (continued):

WELL NUMBER	SAMPLE DATE	Lead Dissolved	Lithium Dissolved	Manganese Dissolved	Mercury Dissolved	Molybdenum Dissolved	Nickel Dissolved	Selenium Dissolved	Silica Dissolved	Silver Dissolved	Strontium Dissolved	Titanium Dissolved
91 01D	10/00/78											
95 01D	10/00/78	1.1										
CT-01	05/27/82	18.2 (2)		188 (2)								
CT-02	05/27/82	14.7 (2)		34.8 (2)								
CT-03	05/27/82	2.73 (2)		17.6 (2)								
CT-04	05/27/82	2.72 (2)		32.7 (2)								
CT-84-1	05/02/84	<0.02	<0.10			<0.05	0.03		6.8 (1)	<0.02	0.78	<0.02
CT-84-1	05/02/84		0.029	33.6		<0.020	0.020		35.8	<0.002	0.80	0.015
CT-84-10	04/27/84	0.04	<0.10	12.3	<0.001	0.05	<0.02	<0.005	15.4 (1)	<0.02	<0.10	0.17
CT-84-2	05/04/84	1.49	<0.10			0.05	0.09		7.9 (1)	<0.02	0.55	<0.02
CT-84-2	05/04/84		0.053	87.2		0.11	0.064		40.2	0.018	0.55	0.018
CT-84-3	05/02/84	2.05	<0.10			0.07	0.10		6.6 (1)	0.14	0.78	0.03
CT-84-3	05/04/84		0.053	171		0.20	0.12		37.8	0.042	0.79	0.040
CT-84-4	04/27/84	<0.02	<0.10	22.4	<0.001	<0.05	0.03	<0.005	12.5 (1)	<0.02	<0.10	0.16
CT-84-5	05/02/84	<0.02	<0.10			0.05	<0.02		11.8 (1)	<0.02	0.94	0.02
CT-84-5	05/02/84		0.092	0.70		0.030	<0.010		23.2	<0.002	1.11	0.016
CT-84-8	04/27/84	<0.02	<0.10	29.5	<0.001	0.23	.09	<0.005	14.1 (1)	<0.02	<0.10	<0.02
CT-84-8AP	05/02/84		0.34	23.6		0.060	0.070		60.6	<0.002	1.32	0.022
CT-84-8AP	NONE GIVEN	0.23	0.42			0.08	0.12		11.8 (1)	<0.02	1.21	0.02
NC-1	11/04/82	0.08	0.46	38.6		0.05	0.07		10.3	0.031	2.08	0.031
NC-1	04/22/83	<0.040	0.400	25.0		0.060	0.050		65.3	0.010	1.500	0.030
NE-2	11/11/82	0.11	0.099	0.21		0.02	0.02		33.7	0.002	0.69	0.024
NE-2	04/22/83	<0.040	0.130	0.023		<0.020	<0.010		37.5	<0.002	0.750	0.017
NW-1	11/04/82	0.11	0.60	65.6		0.07	0.17		95.7	0.073	2.10	0.053
NW-1	04/23/83	<0.040	0.540	56.2		0.080	0.120		81.1	0.008	2.130	0.037
NW-1	07/18/84		0.52	57.3		0.19	0.18		97.8	0.024	1.52	0.040
NW-2	11/04/82	0.61	0.058	73.3		0.07	0.15		117	0.047	1.54	0.050
NW-2	04/23/83	0.220	0.390	60.4		0.080	0.100		76.0	0.016	1.030	0.030
NW-2	07/18/84		0.42	41.9		0.13	0.11		102	0.011	1.08	0.028
NW-2	11/05/85		0.56	39.4		0.080	0.080		133	0.003	1.29	0.029
NW-3	01/26/83	<0.04	0.068	4.42		0.02	0.02		15.9	<0.002	1.64	0.027
NW-4	04/22/83	<0.040	0.580	54.4		0.110	0.120		105	0.009	1.500	0.032
S-1	04/23/83	<0.040	0.055	0.021		<0.020	<0.010		26.0	<0.002	0.940	0.015
S-2	11/13/82	<0.04	0.050	0.41		<0.02	<0.01		14.2	<0.002	0.53	0.006
S-2	04/23/83	<0.040	0.330	0.015		<0.020	<0.010		18.7	0.005	2.460	0.017
S-3	11/09/82	0.04	0.074	0.34		0.28	<0.01		27.5	0.007	0.96	0.021
S-3	04/22/83	<0.040	0.070	0.14		0.130	<0.010		24.4	<0.002	0.940	0.016
S-4	11/09/82	0.05	0.070	1.67		<0.02	0.01		33.5	0.007	0.84	0.020
S-4	04/22/83	0.060	0.065	1.99		0.030	0.010		27.9	0.002	0.740	0.013
SW-1	11/13/82	<0.04	0.052	2.16		0.02	<0.01		28.5	0.007	0.39	0.012
SW-1	07/19/84		0.045	0.56		<0.020	0.020		24.6	<0.002	0.044	0.009
SW-1A	07/20/84		0.036	1.35		<0.020	<0.010		23.2	<0.002	0.43	0.009
SW-2	11/13/82	0.08	0.057	1.70		0.02	<0.01		25.2	0.004	0.36	0.016
SW-2	07/20/84		0.051	1.02		<0.020	<0.010		34.6	<0.002	0.46	0.011
SW-3	04/23/83	0.380	0.200	30.6		0.030	0.050		81.1	<0.002	0.830	0.024

NOTE: Units are mg/l unless otherwise noted.
(1) Silica reported as Si.
(2) Total recoverable analysis.
Sample locations shown on Figure 2-3.

METALS (continued):

WELL NUMBER	SAMPLE DATE	Vanadium Dissolved	Zinc Dissolved	Zirconium Dissolved	COMMENTS:
91 01D	10/00/78		100		Old Rouse Auger hole No. 6, near east end of Colorado Tailings.
95 01D	10/00/78		210		Auger hole near northwest edge of Colorado Tailings.
CT-01	05/27/82		265 (2)		
CT-02	05/27/82		44.7 (2)		
CT-03	05/27/82		114 (2)		
CT-04	05/27/82		0.13		
CT-84-1	05/02/84		37.1		
CT-84-1	05/02/84	0.004	10.9	<0.004	INTRASEARCH COLLECTED SAMPLE ALSO.
CT-84-10	04/27/84	<0.2	63.7		
CT-84-2	05/04/84		270		Nested with CT-84-3.
CT-84-2	05/04/84	0.008	208	<0.004	Nested with CT-84-3. Filter moderate amount sediment.
CT-84-3	05/02/84		39.5		Nested with CT-84-2.
CT-84-3	05/04/84	0.032	303	0.017	Nested with CT-84-2. Large amount sediment. Pumped 5 min.
CT-84-4	04/27/84	<0.2	48.5		
CT-84-5	05/02/84		0.26		Nested with CT-84-6.
CT-84-5	05/02/84	0.010	0.18	<0.004	Nested with CT-84-6.
CT-84-8	04/27/84	<0.2	118		
CT-84-8AP	05/02/84	0.015	82	<0.004	SAMPLED PRIOR TO PUMP TEST. INTRASEARCH ALSO SAMPLED.
CT-84-8AP	NONE GIVEN		109		
NC-1	11/04/82	0.030	89.4	0.029	First 3 min pumped very clean, then turned dirty. Sampled at 10 min.
NC-1	04/22/83	0.001	86.4	0.015	Well pumped prior to sampling. SC and pH Taken after pumping 10 min.
NE-2	11/11/82	0.007	0.30	0.005	Very Clean. Small amount SS. Well bailed. Snowing
NE-2	04/22/83	<0.001	0.100	<0.003	Well pumped 10 min before sampling. SC & pH taken after pumping.
NW-1	11/04/82	0.16	166	0.075	Nested with NW-2. Water turned dirty. Sample collected at 5 min.
NW-1	04/23/83	0.022	123	0.018	Nested with NW-2. Pumped 10 min before sampl. SC and pH after.
NW-1	07/18/84	0.13	188	0.051	Nested with NW-2. Filter easily clogged. Fine silt and clay.
NW-2	11/04/82	0.13	214	0.048	Nested with NW-1. Very black. 100 ML per filter. Pumped 3 min.
NW-2	04/23/83	0.058	157	0.024	Nested with NW-1. Well pumped 10 minutes prior to sampling.
NW-2	07/18/84	0.082	135	0.026	Nested with NW-1. Semi-clear filtrate. Not much sediment.
NW-2	11/05/85	0.081	127	0.011	Nested with NW-1. Murky brown. pH unstable.
NW-3	01/26/83	0.017	2.15	0.019	Moderate amount sediment. Well pumped dry 2x before sampling.
NW-4	04/22/83	0.075	161	0.031	Well pumped app. 10 min. prior to smapling SC & pH taken after pump.
S-1	04/23/83	0.005	0.110	<0.003	Well pumped 10 min before sampling. SC and pH taken after pumping.
S-2	11/13/82	0.004	0.74	0.006	Sample stratified. FU and FA cations differ.
S-2	04/23/83	<0.001	2.650	0.005	Well pumped prior to sampling. SC and pH taken after pumping.
S-3	11/09/82	0.013	0.41	0.006	Nested with S-4. Water moderately clean. Pumped 5 min.
S-3	04/22/83	<0.001	0.420	0.003	Nested with S-4. Pumped 10 min prior sampling, SC & pH taken.
S-4	11/09/82	0.014	1.45	0.006	Very clean. Shallow nested pair well. Pumped 3 min before sampled.
S-4	04/22/83	<0.001	1.660	<0.003	Nested pair shallow well. Pumped app. 10 min. prior to sampling.
SW-1	11/13/82	0.009	0.70	0.009	Nested with SW-2.
SW-1	07/19/84	<0.001	1.77	<0.004	Nested with SW-2. Fine silt. Cleared up some with pumping.
SW-1A	07/20/84	<0.001	0.79	<0.004	REPLACES SW-1. VERY DIRTY, USED PREFILTER.
SW-2	11/13/82	0.002	0.13	0.009	
SW-2	07/20/84	<0.001	1.74	<0.004	NESTED WITH SW-1. VERY DIRTY.
SW-3	04/23/83	0.048	75.9	0.005	Nested with SW-4. Well pumped app. 10 min prior to sampling.

NOTE: Units are mg/l unless otherwise noted.
(2) Total recoverable analysis.
Sample locations shown on Figure 2-3.

WELL NUMBER	LEGAL LOCATION	SAMPLER/ AGENCY	SAMPLE DATE	SAMPLE TIME	LABORATORY	LAB NUMBER	SAMPLING METHOD	FORMATION	PHYSICAL PARAMETERS Water Temperature (C)	Field pH (S.U.)	QUESTIONABLE DATA
SW-4	T03N R08W S23 CAAB	MBMG*HRM	11/20/82	14:00	MBMG	82R1133	PUMPED	ALLUVIUM	7.4	6.76 (1)	YES
SW-4	T03N R08W S23 CAAB	MBMG*HRM	04/23/83		MBMG	83Q0172	PUMPED	ALLUVIUM	9.2	5.79	YES
SW-5	T03N R08W S23 CAAB	MBMG*HRM	11/20/82	15:50	MBMG	82Q1134	PUMPED	TAILINGS	7.3	4.85 (1)	
SW-5	T03N R08W S23 CAAB	MBMG*HRM	04/23/83		MBMG	83Q0173	PUMPED	TAILINGS	9	5.04	

NOTE: Units are mg/l unless otherwise noted.
Sample locations shown on Figure 2-3.

COMMON IONS:

WELL NUMBER	SAMPLE DATE	Specific Conductance (umhos/cm)	Total Dissolved Solids	Calcium	Magnesium	Potassium	Sodium	Sulfate	Chloride	Fluoride	Nitrate as N	Bicarbonat
SW-4	11/20/82	299.8 (1)	209.63	28.2	6.4	3.2	14.6	96.5	6.9	0.4	0.09	39.3
SW-4	04/23/83	414.2 (1)	320.95	36.5	7.6	2.9	22.5	155	10.1	0.78	0.03	49.0
SW-5	11/20/82	547.9 (1)	413.54	45.7	9.8	3.6	28.1	251	15.2	2.7	0.65	2.4
SW-5	04/23/83	623 (1)		52.1	11.1	3.1	28.1	321	8.9	0.91	1.0	0

NOTE: Units are mg/l unless otherwise noted.
(1) Lab measurement.
(2) Nitrate plus nitrite as N.
Sample locations shown on Figure 2-3.

WELL NUMBER	SAMPLE DATE	CATION/ANION BALANCE Total Cations (meq/l)	Total Anions (meq/l)	Percent Difference	METALS: Aluminum Dissolved	Arsenic Dissolved	Barium Dissolved	Boron Dissolved	Cadmium Dissolved	Chromium Dissolved	Copper Dissolved	Iron Dissolved
SW-4	11/20/82	2.7	3.0	-10.5	0.09			0.07	<0.002	0.007	0.036	0.17
SW-4	04/23/83	4.2	4.5	-6.9	0.044	0.083		0.090	0.005	0.003	0.018	17.7
SW-5	11/20/82	5.2	5.7	-9.2	0.80			0.14	0.031	0.008	3.46	7.45
SW-5	04/23/83	6.0			1.200	0.014		0.130	0.054	0.005	15.4	11.4

NOTE: Units are mg/l unless otherwise noted.
(2) Total recoverable analysis.
Sample locations shown on Figure 2-3.

METALS (continued):

WELL NUMBER	SAMPLE DATE	Lead Dissolved	Lithium Dissolved	Manganese Dissolved	Mercury Dissolved	Molybdenum Dissolved	Nickel Dissolved	Selenium Dissolved	Silica Dissolved	Silver Dissolved	Strontium Dissolved	Titanium Dissolved
SW-4	11/20/82	<0.04	0.053	3.21	<0.02	0.02			30.6	0.010	0.19	0.011
SW-4	04/23/83	<0.040	0.095	4.8	0.020	0.030			38.9	0.008	0.260	0.007
SW-5	11/20/82	0.05	0.067	9.56	<0.02	0.02			38.6	0.003	0.28	0.015
SW-5	04/23/83	0.190	0.058	11.9	0.020	0.020			43.5	<0.002	0.340	0.005

NOTE: Units are mg/l unless otherwise noted.
(1) Silica reported as Si.
(2) Total recoverable analysis.
Sample locations shown on Figure 2-3.

METALS (continued):

WELL NUMBER	SAMPLE DATE	Vanadium Dissolved	Zinc Dissolved	Zirconium Dissolved	COMMENTS:
SW-4	11/20/82	0.003	1.55	0.015	Nested with SW-3. Dirty.
SW-4	04/23/83	0.004	1.300	0.011	Nested with SW-3. Pumped app. 10 min prior to sampling.
SW-5	11/20/82	0.001	17.4	0.005	Clear.
SW-5	04/23/83	<0.001	26.4	<0.003	Greenish tinge to water. Nested pair shallow well. Pumped 10 min.

NOTE: Units are mg/l unless otherwise noted.
(2) Total recoverable analysis.
Sample locations shown on Figure 2-3.

COLORADO TAILINGS - SOLIDS ANALYSES SUMMARY

I. Total Metals

A. Site Near NW-1 - Montana Bureau of Mines and Geology (Thornell, undated)

Field No.	Depth (ft)	Material	Fe	Mn	Cu	Ni	Pb	Zn	Co	As	Ag	Au	Cd	Al	B	Hg	Mo	Se
1	0-1.8	Tailings	10,200	360	663	3	480	2,430	<1	678								
2	1.8-2.6	Tailings	15,200	368	997	2	600	3,310	<1	1,300								
3A	2.6-4.5	Tailings	19,400	262	2,050	3	640	2,880	<1	2,320								
3B	2.6-4.5	Tailings	24,300	262	1,950	1	890	4,630	1	2,960								
4A	4.5-6.0	Tailings	19,500	1,540	2,450	1	1,050	4,360	8	1,780								
4B	4.5-6.0	Tailings	18,900	2,180	2,990	1	1,140	5,630	8	1,810								
5A	6.0-7.0	Tailings	24,000	8,000	6,730	6	2,570	8,230	7	1,700								
5B	6.0-7.0	Tailings	24,900	8,400	6,630	5	2,740	8,090	10	1,390								
6A	7.0-7.5	Peat	54,500	12,800	14,300	7	6,370	14,700	10	1,550								
6B	7.0-7.5	Peat	47,100	12,100	13,400	7	6,750	14,800	9	1,280								
7A	7.5-8.5	Peat	50,500	28,600	2,430	7	14,900	22,500	8	523								
7B	7.5-8.5	Peat	48,000	26,500	2,510	7	13,700	20,800	8	504								
8A	8.5-9.5	Peat	44,500	11,200	1,730	10	8,980	17,400	12	504								
8B	8.5-9.5	Peat	40,900	12,400	1,760	9	8,900	13,800	21	565								
9	9.5-10.0	Alluvium	12,600	242	188	1	28	300	10									

Note: All Results Expressed in µg/g. Sample site locations shown on Figure 2-3.

I. Total Metals (continued)

B. Montana Bureau of Mines and Geology (Duaime, et al., 1982)

Field No.	Depth (ft)	Material	Fe	Mn	Cu	Ni	Pb	Zn	Co	As	Ag	Au	Cd	Al	B	Hg	Mo	Se
C-1	0-4.5	Tailings			720		697				1.40	<0.005						
C-2	0-4.5	Tailings			1,336		947				1.94	0.006						
C-3	0-3.5	Tailings			357		396				0.62	<0.005						
C-4	0-4.0	Tailings			183		324				0.62	<0.005						
C-5	0-3.0	Tailings			6,775		1,383				1.88	0.008						
C-6	0-4.7	Tailings			858		592				1.36	0.006						
C-7	0-4.3	Tailings			373		331				0.74	<0.005						
C-8	0-3.3	Tailings			900		410				0.68	<0.005						
C-9	0-2.0	Tailings			1,260		495				0.79	0.010						
C-10	0-5.0	Tailings			941		1,147				0.71	0.008						
C-11	0-3.5	Tailings			1,247		637				0.93	0.006						
CN-12	0-4.1	Tailings			2,384		696				1.15	0.010						
CS-13	0-5.0	Tailings			472		616				0.88	<0.005						
W-2	0-1.5	Tailings			621		510				1.16	<0.005						
W-3	0-4.0	Tailings			3,443		723				1.36	0.016						
W-4	0-4.7	Tailings			1,333		436				0.71	0.008						
W-5	0-3.8	Tailings			2,517		942				0.66	<0.005						
W-6	0-2.0	Tailings			8,965		755				1.68	<0.005						
W-7	0-3.3	Tailings			4,283		663				1.39	0.008						
W-8	0-3.3	Tailings			222		277				0.74	<0.005						

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I. Total Metals (continued)

B. Montana Bureau of Mines and Geology (Duaime, et al., 1982) (continued)

Field No.	Depth (ft)	Material	Fe	Mn	Cu	Ni	Pb	Zn	Co	As	Ag	Au	Cd	Al	B	Hg	Mo	Se
E-1	0-4.3	Tailings			4,959		589				0.58	<0.005						
E-2	0-5.0	Tailings			2,287		521				1.01	0.010						
E-3	0-3.0	Tailings			895		1,196				0.95	0.006						
E-4	0-5.0	Tailings			803		410				1.26	<0.005						
E-5	0-4.8	Tailings			869		892				1.67	0.006						
E-6	0-4.2	Tailings			661		882				1.94	<0.005						
E-7	0-5.0	Tailings			818		901				2.20	<0.005						
E-8	0-5.0	Tailings			724		731				1.75	0.006						

C. Hydrometrics (1983)

Field No.	Depth (inches)	Material	Fe	Mn	Cu	Ni	Pb	Zn	Co	As	Ag	Au	Cd	Al	B	Hg	Mo	Se
CT-01	0-36	Tailings																
CT-02	0-38	Tailings	8,380	72.9	306	197	247	1,410		371			9.2	5,480	41.0	0.52	5.7	<0.02
CT-02	38-50	Tailings																
CT-04	0-26	Tailings																

II. Water Soluble

A. Montana Bureau of Mines and Geology - Site near NW-1 (Thornell, undated)

Field No.	Depth (ft)	Material	Fe	Mn	Cu	Ni	Pb	Zn	Co	As	Ag	Au	Cd	Al	B	Hg	Mo	Se
1	0-1.8	Tailings	8,330	93.1	270	<0.5	480	209	<1	624								
2	1.8-2.6	Tailings	1,3200	101	340	<0.5	530	226	<1	1,380								
3A	2.6-4.5	Tailings	23,600	84	580	<0.5	800	285	1	2,780								
3B	2.6-4.5	Tailings	18,600	59	480	<0.5	680	197	1	2,260								
4A	4.5-6.0	Tailings	14,100	1,580	2,040	<0.5	1,150	1,430	2	1,280								
4B	4.5-6.0	Tailings	13,300	1,630	2,030	<0.5	1,110	1,362	3	1,250								
5A	6.0-7.0	Tailings	15,800	5,320	6,150	0.7	2,710	5,180	3	1,140								
5B	6.0-7.0	Tailings	18,900	6,600	8,190	1.3	3,720	6,490	3	1,21								
6A	7.0-7.5	Peat	19,800	9,060	10,600	2.2	6,640	9,380	4	1,030								
6B	7.0-7.5	Peat	19,000	16,700	6,420	3.2	8,57	12,000	6	651								
7	7.5-8.5	Peat	18,300	23,100	2,020	2.6	11,80	13,500	6	463								
8	8.5-9.5	Peat	13,500	15,200	510	3.2	13,300	16,700	6	111								
9	9.5-10.5	Alluvium	2,030	52	130	<0.5	40	349	2	9								

B. Hydrometrics

Field No.	Depth (inches)	Material	Fe	Mn	Cu	Ni	Pb	Zn	Co	As	Ag	Au	Cd	Al	B	Hg	Mo	Se
CT-01	0-36	Tailings		13.1	12.9			31.1		0.31				0.9	0.5			
CT-02	0-38	Tailings		3.1	26.3			23.8		0.52			0.09	8.7	0.4		<0.02	
CT-02	38-50	Tailings		11.2	74.5			35.6		0.74				4.6	<0.1			
CT-04	0-26	Tailings		10.3	46.0			55.2		0.28				6.9	0.4			

II. Water Soluble (continued)

Field	Depth (inches)	Ca	Mg	Na	Chloride	SO_4	Nitrate-N	P	Sulfur (HCl Rinsed)
CT-01	0-36	104	24	62	15.3	500			4,700
CT-02	0-38	211	19	67	14.3	780	1.1	9.5	4,700
CT-03	38-50	304	34	45	14.1	520			92
CT-04	0-26	62	15	62	8.4	617			3,500

III. Ammonium Acetate Soluble

A. Hydrometrics (1983)

Field No.	Depth (inches)	Material	Fe	Mn	Cu	Ni	Pb	Zn	Co	As	Ag	Au	Cd	Al	B	Hg	Mo	K
CT-02	0-38	Tailings		10.3	54.0			37.3						33				11.3

IV. EP Toxicity[a]

A. MDHES, 1985

Field No.	Depth (feet)	Material	Ag	As	Ba	Cd	Cr	Hg	Pb	Se
CT-01	0-0.25	Tailings	<0.01	0.12	0.34	0.018	<0.02	<0.05	<0.05	<0.002
CT-02	0-0.25	Tailings	<0.01	0.08	0.10	0.017	<0.02	<0.05	<0.05	<0.002
CT-03	0-0.25	Tailings	<0.01	0.30	0.10	0.011	<0.02	<0.05	<0.05	<0.002
CT-04	0-0.25	Tailings	<0.01	0.29	0.07	0.184	<0.02	<0.05	0.72	<0.002
CT-05	0-0.25	Tailings	<0.01	<0.05	0.09	<0.005	<0.02	<0.05	<0.05	<0.002

[a] All data in mg/l.

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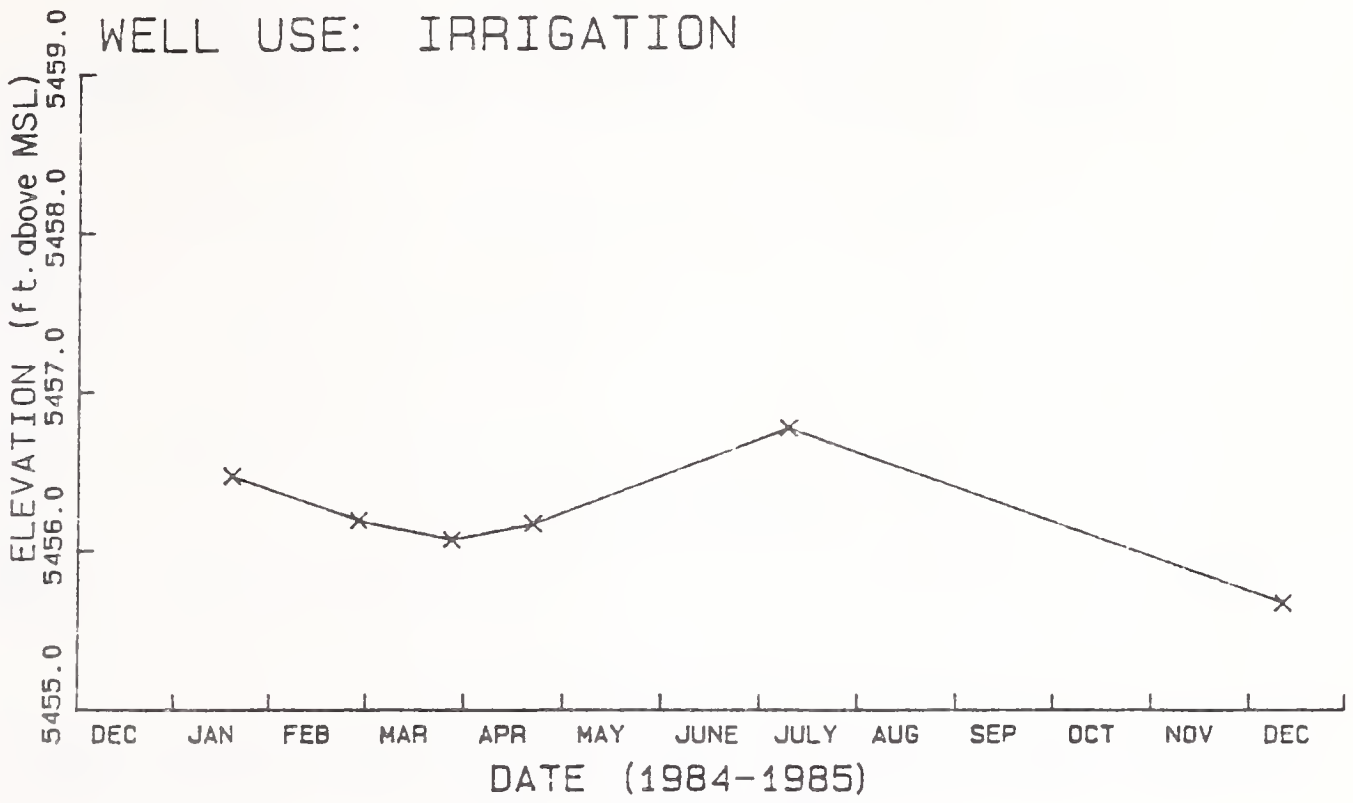
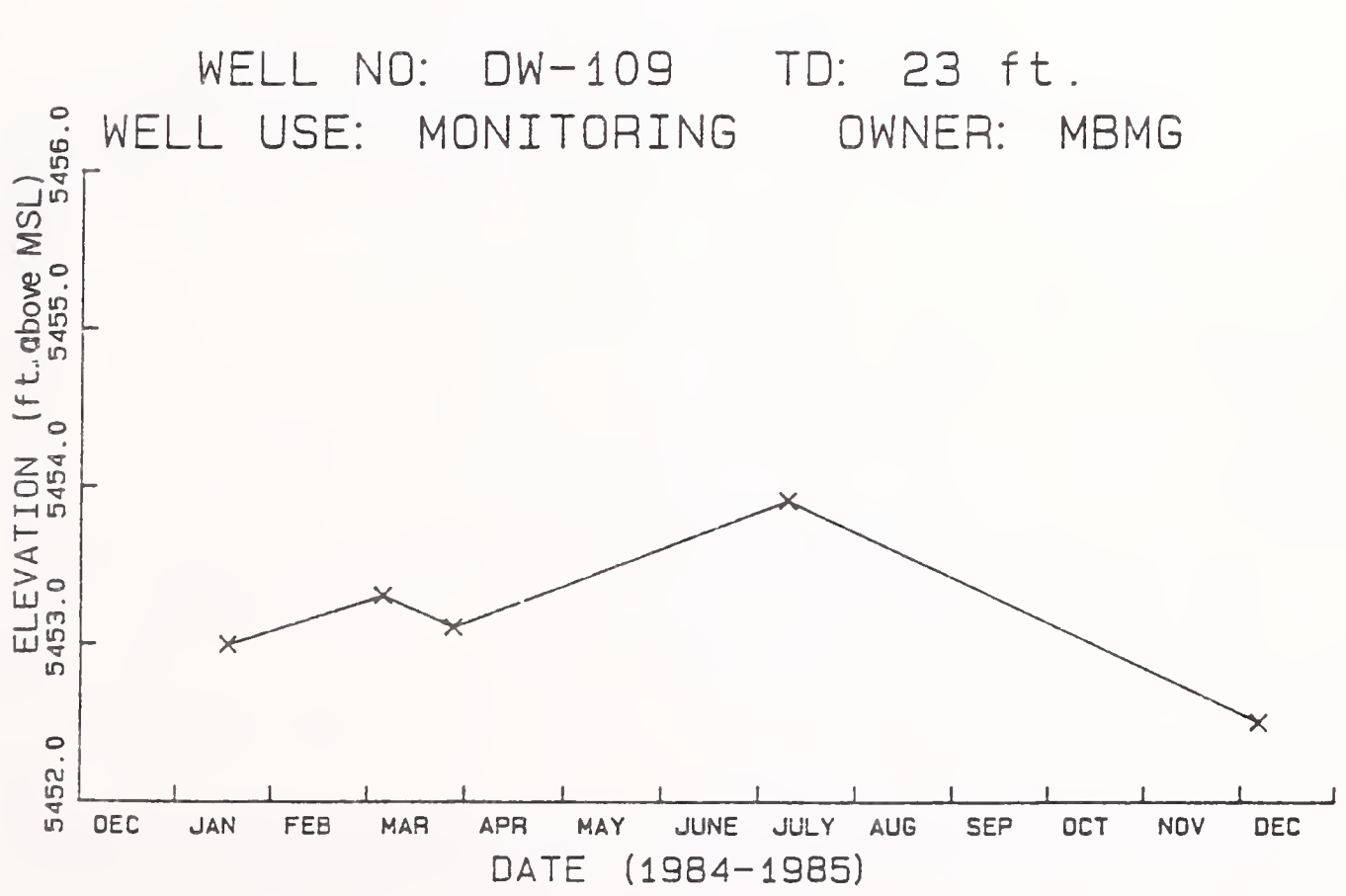
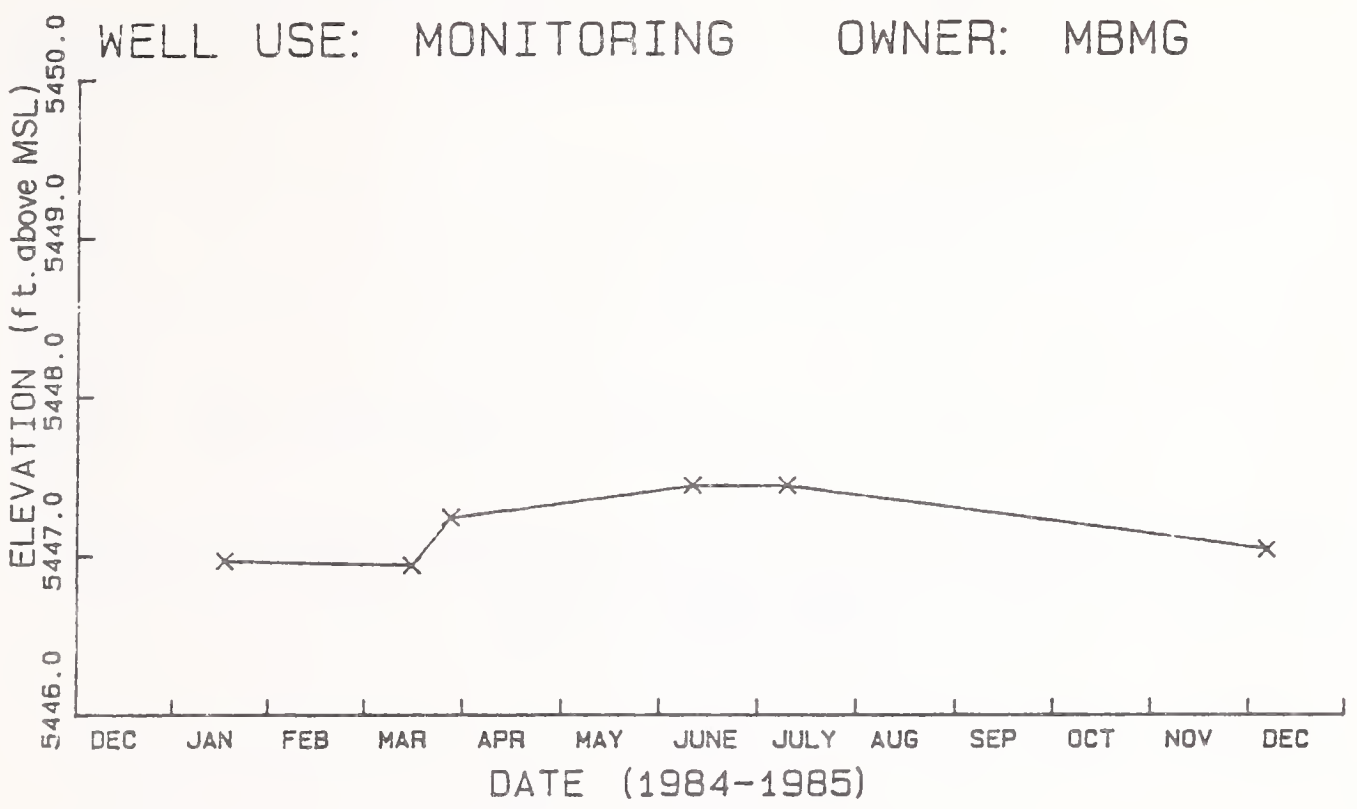
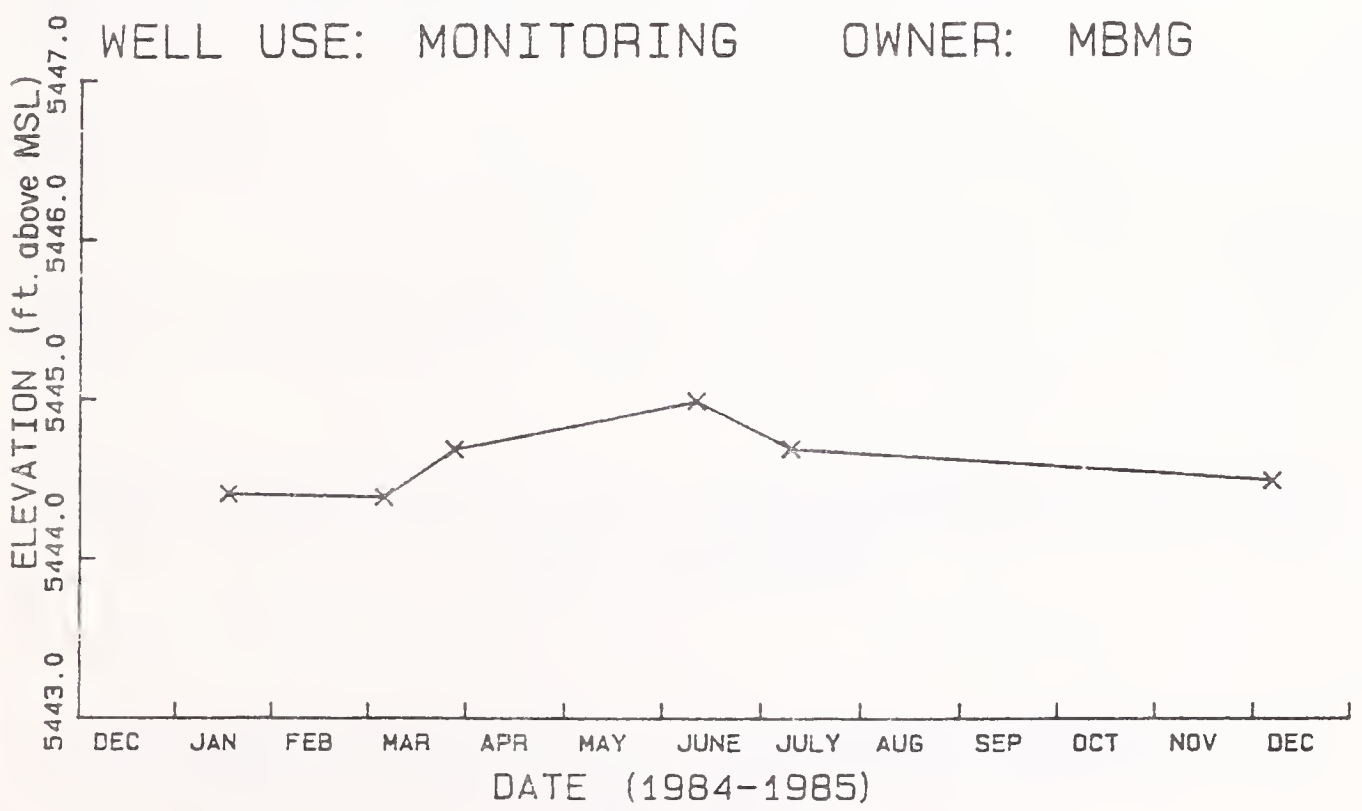
ATTACHMENTS I-C
HISTORIC TRENDS IN GROUND-WATER ELEVATIONS





GROUND WATER ELEVATIONS IN SELECTED METRO STORM DRAIN AREA MONITORING WELLS: SILVER BOW CREEK RI; (1985 DATA)





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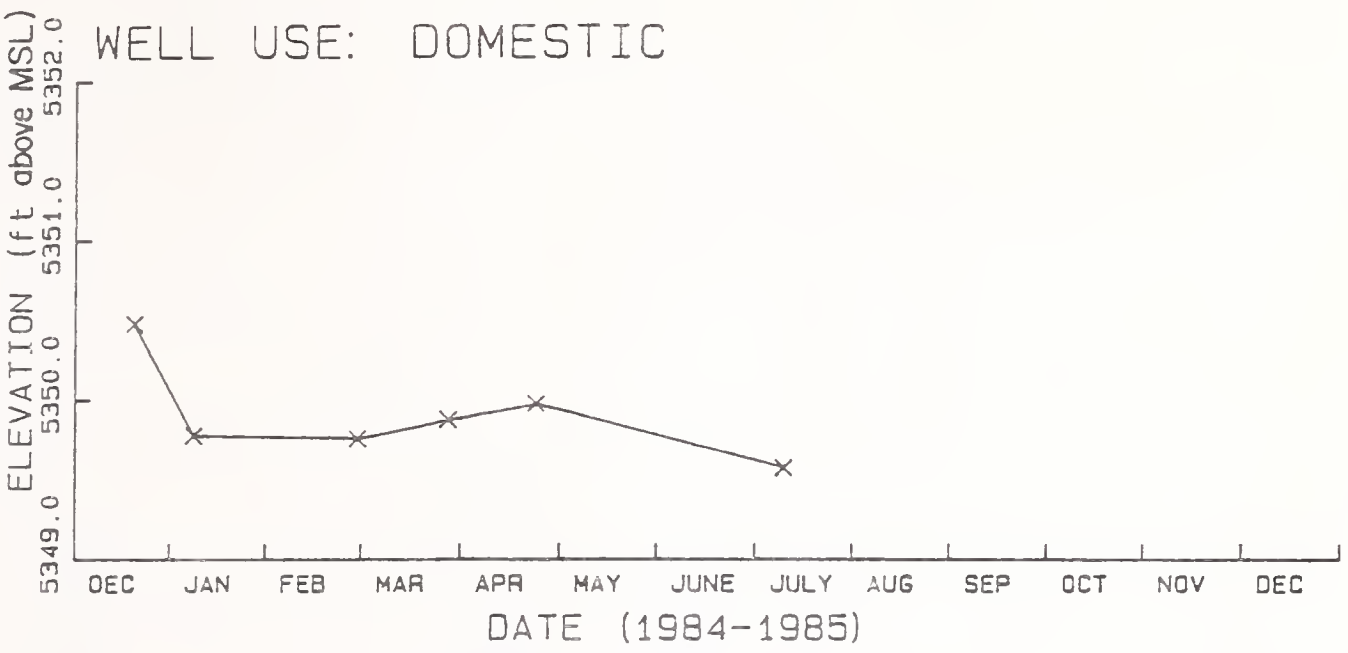
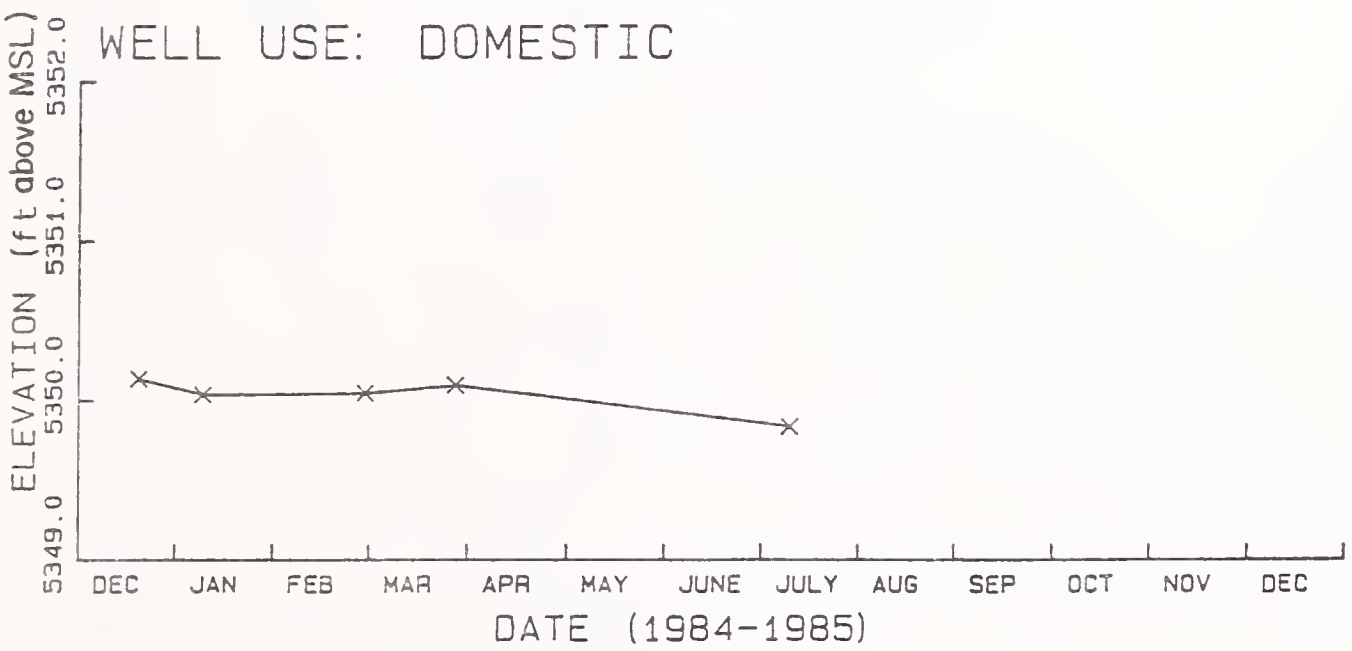
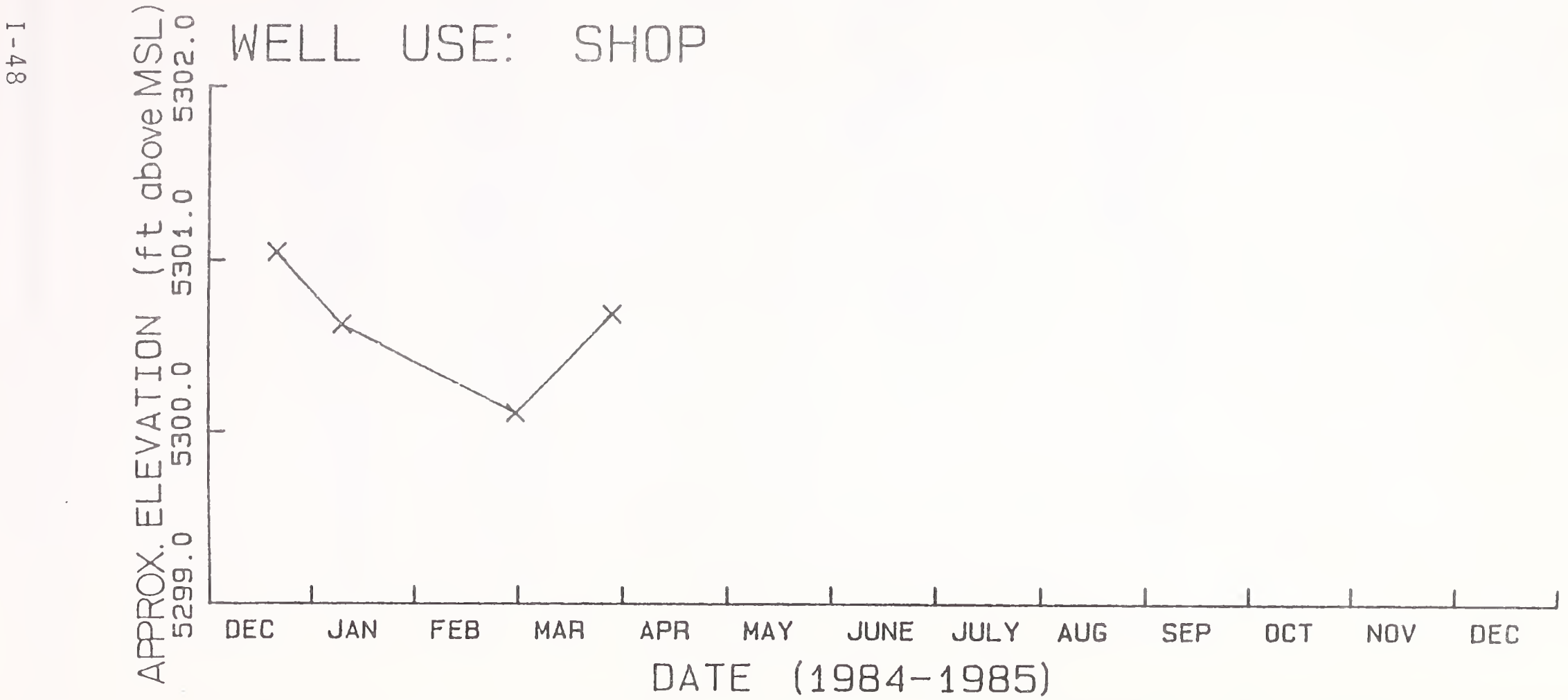


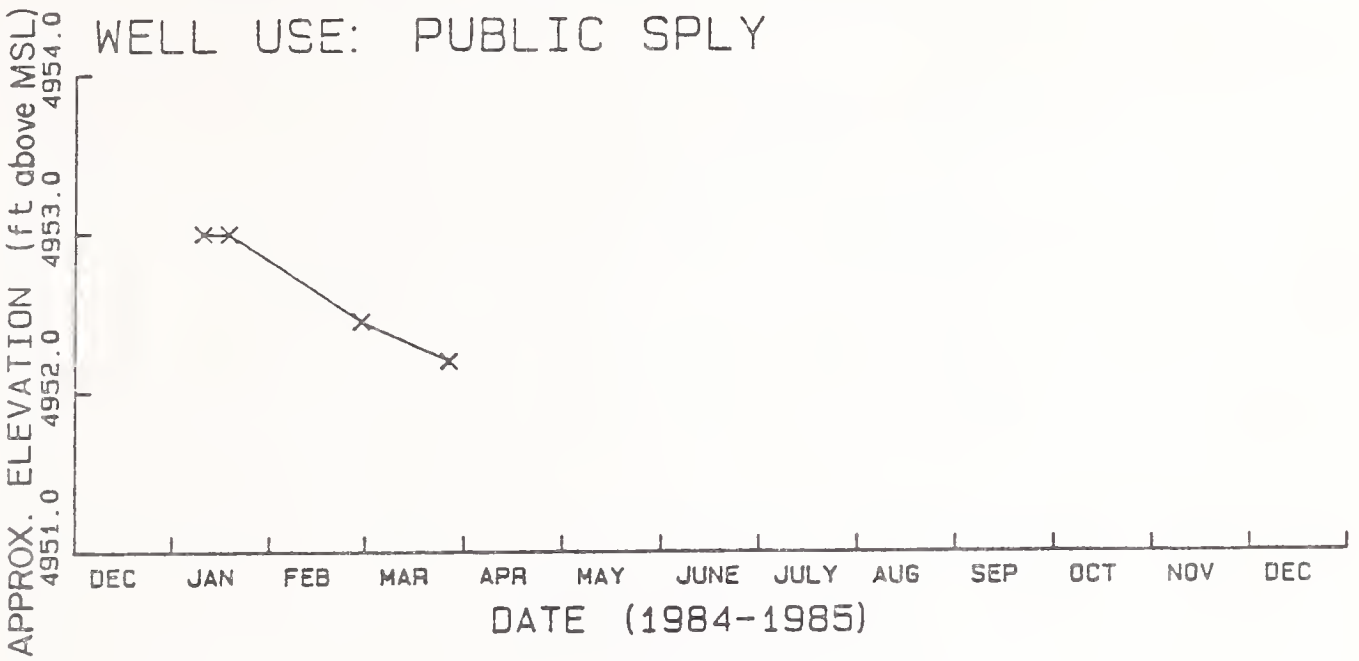


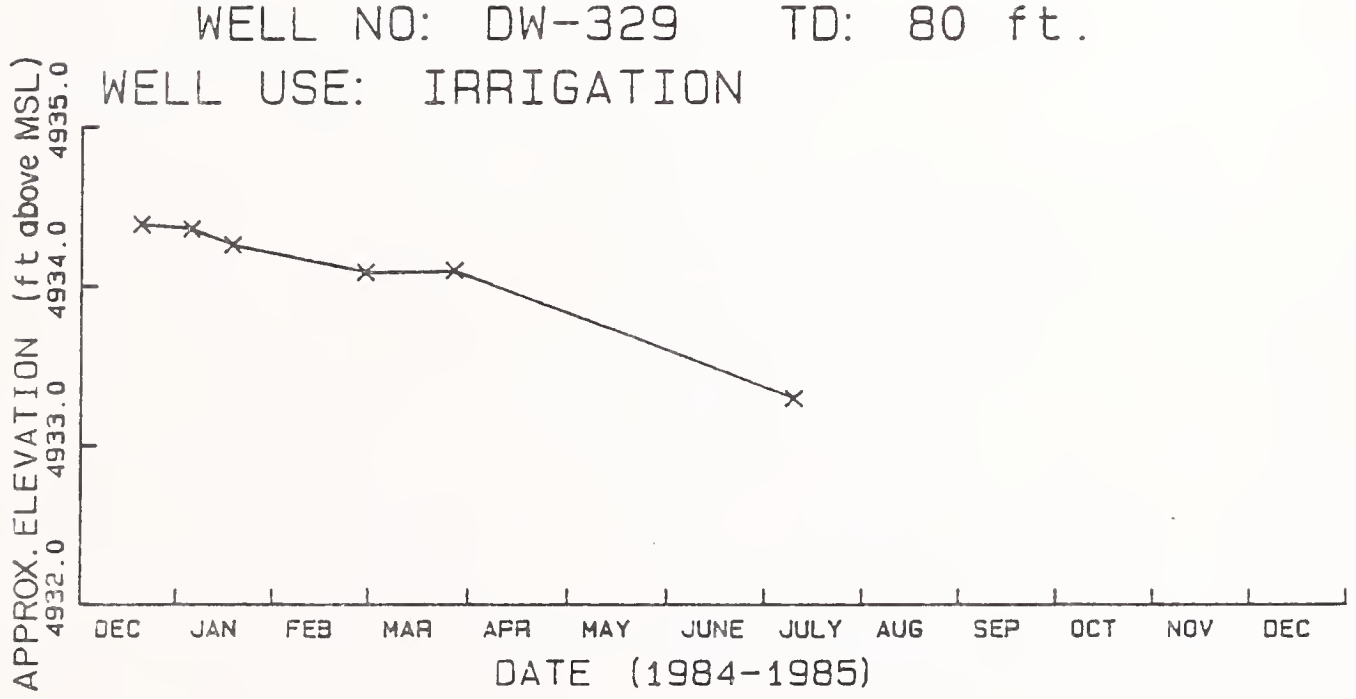
GROUND WATER ELEVATIONS IN SELECTED MONITORING WELLS
ROCKER TO SILVER BOW: SILVER BOW CREEK RI;
(1985 DATA)

GROUND WATER ELEVATION IN MONITORING WELL SILVER BOW
TO MILES CROSSING: SILVER BOW CREEK RI;
(1985 DATA)



I-4





GROUND WATER ELEVATIONS IN SELECTED UPPER DEER LODGE VALLEY MONITORING WELLS: SILVER BOW CREEK RI; (1985 DATA)

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ATTACHMENT II

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ATTACHMENT II-A
SILVER BOW CREEK WELL INVENTORY

WELL NUMBER	CROSS REFERENCE WELL NUMBER	LEGAL LOCATION	TOTAL DEPTH DRILLED (FT)	TOTAL DEPTH CASED (FT)	CASING DIAMETER AND TYPE (IN)	GAGE OR WALL THICK-NESS (IN)	BORE-HOLE DIAMETER (IN)	INTERVAL PER-FORATED (FT) AND METHOD (see footnote)		PROBABLE AQUIFER
DW-101	AMC #5	T03N R07W S17 CC	90		6 STEEL	.250				SBC Qal
DW-102	AMC #6	T03N R07W S17 CCC	65	63	6 STEEL	.250		53-63		SBC Qal
DW-103	AMC #8	T03N R07W S20 ABA	67	65	6 STEEL	.250		55-65		SBC Qal
DW-105	AMC #12	T03N R07W S19 AAC	47	45	STEEL	.250		35-45		SBC Qal
DW-106	AMC #15	T03N R07W S20 ADA	103	101	6 STEEL	.250		97-101		SBC Qal
DW-107	AMC #13	T03N R07W S19 ADC	57	55	6 STEEL	.250		47-55		SBC Qal
DW-108	MBMG MF-05	T03N R07W S19 BAC	23	17	4 PVC	.125				SBC Qal
DW-109	MBMG MF-06	T03N R07W S19 BAD	23	18	4 PVC	.125				SBC Qal
DW-110	MBMG MF-07	T03N R07W S19 BDA	18	12	4 PVC	.125				SBC Qal
DW-111	MBMG MF-11	T03N R07W S19 BDC	15.5	18	4 PVC	.125				SBC Qal
DW-112	MBMG MF-09	T03N R07W S19 CBA	18	16	4 PVC	.125				SBC Qal
DW-113	MBMG MF-10	T03N R07W S19 CBB	23	17	4 PVC	.125				SBC Qal
DW-114	MBMG MF-08	T03N R07W S19 BCC	18	14	4 PVC	.125				SBC Qal
DW-115	MBMG MF-04	T03N R07W S19 BCC	28	26	4 PVC	.125				SBC Qal
DW-116	AMC #23	T03N R08W S24 DAA	31	33.5	6 STEEL	.250		19-29		SBC Qal
DW-117	MBMG MF-03	T03N R08W S24 DAA	18		4 PVC	.125				SBC Qal
DW-118	AMC #24	T03N R08W S24 DAD	25	28	6 STEEL	.250		13-23		SBC Qal
DW-119	MBMG MF-02	T03N R08W S24 DAC	NO LOG		4 PVC	.125				SBC Qal
DW-120		T03N R08W S25 AAB	80	80	6 STEEL	.250			1	SBC Qal
DW-121	MBMG MF-01	T03N R08W S24 DBC	12.1		4 PVC	.125				SBC Qal
DW-122	MBMG MF-12 & MP-03	T03N R08W S24 CBC	43.0	29	4 PVC	.125	6	14-29	4	SBC Qal
DW-123	MBMG MF-14 & MP-01	T03N R08W S23 DAD	53	37	4 PVC	.125		17-37	4	SBC Qal
DW-124A	MBMG MP-01A	T03N R08W S23 DAD		13	4 PVC	.125		7-13		SBC Qal
DW-124B	MBMG MP-02	T03N R08W S23 DAD		13	4 PVC	.125		8-13		SBC Qal
DW-124C	MBMG MP-04	T03N R08W S23 DAD		33	4 PVC	.125		23-33		SBC Qal
DW-124D	MBMG MP-06	T03N R08W S23 DAD		22	4 PVC	.125		12-22		SBC Qal
DW-124E	MBMG MP-06A	T03N R08W S23 DAD		13	4 PVC	.125		8-13		SBC Qal
DW-124F	MBMG S-1 & DW-133	T03N R08W S23 DAD	21.70	17	4 PVC	.125		12-17		SBC Qal
DW-124G	MBMG MP-07	T03N R08W S24 CCB	18	16'	4 PVC	.125	6	6-16	4	SBC Qal
DW-125	MBMG MF-13 & MP-05	T03N R08W S24 CCC	48	37	4 PVC	.125	6	16-31		Tqm
DW-127		T03N R08W S23 BCD	NO LOG		4 PVC	SCH 40				Qal
DW-128		T03N R08W S23 BBC	65	65	6 STL 0-39'	.250		35-65	4	Tqm
DW-129		T03N R08W S22 DBB	80	80	6 STL 0-20'	.250		40-80	4	Tqm
DW-130	MBMG NE-2	T03N R08W S23 ACD		20	4 PVC	.250		15-20		SBC Qal
DW-131		T03N R08W S24 BDD	35	35	6 STEEL	.250		28-33	3	SBC Qal
DW-132		T03N R08W S23 DAD	24	24	48 CONCRETE					SBC Qal
DW-133	MBMG S-01 & DW-124F	T03N R08W S23 DDA	21.7	17	4 PVC	.125		12-17	4	SBC Qal
DW-134	MBMG CT-84-1	T03N R08W S23 DAB	35	16	4 PVC	.125		11-16	4	SBC Qal
DW-135	MBMG S-05	T03N R08W S23 CAD	18.7	18.7	4 PVC	.125				SBC Qal
DW-136	MBMG CT-84-2	T03N R08W S24 CBA	25.0	15	4 PVC	.125		10-15	4	SBC Qal
DW-137	MBMG CT-84-3	T03N R08W S24 CBA	13	10	4 PVC	.125		5-10	4	SBC Qal
DW-138	MP&T 85-01	T03N R08W S23 DAD	20	20	4 PVC	SCH 40	7.5	3-20	6	SBC Qal
DW-139	MP&T 85-02	T03N R08W S23 DAD	25	25	4 PVC	SCH 40	7.5	5-25	6	SBC Qal
DW-140	MP&T 85-03	T03N R08W S24 CBC	37	20	4 PVC	SCH 40	7.5	5-20	6	SBC Qal
DW-141	MP&T 85-06	T03N R08W S24 CBC	25	25	4 PVC	SCH 40	7.5	5-25	6	SBC Qal

Notes on perforation methods: 1. Open bottom only. 2. Slotted with Mill's Knife. 3. Slotted with a torch. 4. Saw cut. 5. Factory slotted - 0.030 in. 6. Factory slotted - 0.010 in. 7. Screened and pulled casing.

Notes on aquifers: Qal = Quarternary Alluvium, Tv = Tertiary Volcanics, Tqm = Tertiary Quartz Monzonite, Ts = Tertiary Sed-iments.

Note: Blanks indicate non-applicable or unknown.

WELL NUMBER	STATIC WATER LEVEL (FT)	DATE MEASURED	MEASURING POINT (MP) DESCRIPTION	MP HEIGHT FROM G.S. (FT)	MEASURING POINT ELEVATION (FT)	HOW DETERMINED?	WELL USE	WELL OWNER	OWNER'S PHONE
DW-101	77.1	12/10/85	TOP OF STEEL	2.1	5566.30	SURV/AMC*	MONITORING	AMC	723-4311
DW-102	34.2	03/28/85	CASING TOP	1.9	5493.36	SURV/S&A	MONITORING	AMC	723-4311
DW-103	62.0	12/10/85	TOP OF STEEL	2.0	5580.30	SURV/AMC*	MONITORING	AMC	723-4311
DW-105	21.1	03/28/85	CASING TOP	2.0	5480.10	SURV/S&A	MONITORING	AMC	723-4311
DW-106	90.4	12/10/85	TOP OF STEEL	3.0	5612.20	SURV/AMC*	MONITORING	AMC	723-4311
DW-107	19.7	03/28/85	CASING TOP	2.4	5475.77	SURV/S&A	IRRIGATION	CITY OF BUTTE	723-8262
DW-108	13.1	12/06/85	WOODEN PLATFORM	0.0	5466	SURV/S&A	MONITORING	MBMG	496-4157
DW-109	12.0	03/28/85	WOODEN PLATFORM	.9	5465.11	SURV/S&A	MONITORING	MBMG	496-4157
DW-110	7.2	03/28/85	WOODEN PLATFORM	.4	5458.01	SURV/S&A	MONITORING	MBMG	496-4157
DW-111	7.0	03/28/85	WOODEN PLATFORM	.2	5457.96	SURV/S&A	MONITORING	MBMG	496-4157
DW-112	9.1	03/28/85	WOODEN PLATFORM	-.4	5456.34	SURV/S&A	MONITORING	MBMG	496-4157
DW-113	6.5	03/28/85	WOODEN PLATFORM	.2	5451.02	SURV/S&A	MONITORING	MBMG	496-4157
DW-114	3.3	03/28/85	WOODEN PLATFORM	0.0	5447.99	SURV/S&A	MONITORING	MBMG	496-4157
DW-115	14.3	03/28/85	WOODEN PLATFORM	.5	5459.66	SURV/S&A	MONITORING	MBMG	496-4157
DW-116	5.4	03/28/85	CASING TOP	1.8	5448.29	SURV/S&A	MONITORING	AMC	723-4311
DW-117	4.8	12/06/85	WOODEN PLATFORM	1	5446	SURV/S&A	MONITORING	MBMG	496-4157
DW-118	9.3	03/28/85	CASING TOP	1.9	5452.06	SURV/S&A	MONITORING	AMC	723-4311
DW-119	13.5	03/28/85	WOODEN PLATFORM	0.0	5453	SURV/S&A	MONITORING	MBMG	496-4157
DW-120	8.1	12/19/84	CASING TOP	0.7	5454.87	SURV/S&A	DOMESTIC IRR.	WULF	723-4238
DW-121	3.5	03/28/85	CASING TOP	0.0	5443.05	SURV/S&A	MONITORING	MBMG	496-4157
DW-122	41.0	01/18/85	CASING TOP	1.0	5457.05	SURV/MBMG	MONITORING	MBMG	496-4157
DW-123	6.6	01/18/85	CASING TOP	-.3	5438	SURV/MBMG	MONITORING	MBMG	496-4157
DW-124A	OIL	01/18/85	CASING TOP	0.0	5439	SURV/MBMG	MONITORING	MBMG	496-4157
DW-124B	6.8	01/18/85	CASING TOP	.5	5437	SURV/MBMG	MONITORING	MBMG	496-4157
DW-124C	4.9	01/18/85	CASING TOP	0.0	5434	SURV/MBMG	MONITORING	MBMG	496-4157
DW-124D	7.3	01/18/85	CASING TOP	-.4	5438	SURV/MBMG	MONITORING	MBMG	496-4157
DW-124E	7.7	01/18/85	CASING TOP	-.5	5438	SURV/MBMG	MONITORING	MBMG	496-4157
DW-124F	9.1	01/18/85	CASING TOP	1.9	5438.87	SURV/S&A	MONITORING	MBMG	496-4157
DW-124G	3.6	03/06/85	CASING TOP	-.4		SURV/MBMG	MONITORING	MBMG	496-4157
DW-125	9.2	01/18/85	CASING TOP	2.2	5439	SURV/MBMG	MONITORING	MBMG	496-4157
DW-127	6.6	01/18/85	CASING TOP	1.5	5418.94	SURV/S&A	MONITORING	DSL	
DW-128	25	09/83	CASING TOP	1.5	5501	TOPO MAP	DOMESTIC	HAUMBERGER	UNKNOWN
DW-129	15	01/07/85	CASING TOP	.6	5506	TOPO MAP	DOMESTIC	DUPUIS	
DW-130	13.7	04/22/85	CASING TOP	2.8	5435.12	SURV/S&A	MONITORING	MBMG	496-4157
DW-131	12.0	01/08/86	TOP OF STEEL	2.0	5447.86	SURV/S&A	INDUSTRIAL	ERICKSON	782-5570
DW-132	6	12/11/85	TOP OF CONCRETE	1	5431.98	SURV/S&A	INDUSTRIAL	BUTTE CITY STP	723-8662
DW-133	9.2	12/11/85	TOP OF PVC	2.1	5438.87	SURV/S&A	MONITORING	EPA	
DW-134	12.3	12/11/85	TOP OF PVC	3.9	5440.53	SURV/S&A	MONITORING	DSL	
DW-135	13.0	12/11/85	TOP OF PVC	3.7	5436.78	SURV/S&A	MONITORING	MBMG	496-4157
DW-136	4.9	12/12/85	TOP OF PVC	1.9	5434.95	SURV/S&A	MONITORING	DSL	
DW-137	3.3	12/12/85	TOP OF PVC	1.0	5433.49	SURV/S&A	MONITORING	DSL	
DW-138	5.8	8/19/85	TOP OF STEEL	1.3	5435.55	SURV/S&A	MONITORING	EPA	
DW-139	5.7	8/19/85	TOP OF STEEL	.2	5432.42	SURV/EPA	MONITORING	EPA	
DW-140	7.1	8/19/85	TOP OF STEEL	0.0	5435.41	SURV/EPA	MONITORING	EPA	
DW-141	7.6	8/19/85	TOP OF STEEL	1.4	5435.34	SURV/EPA	MONITORING	EPA	

NOTE: *AMC SURVEY ELEVATIONS ARE REPORTEDLY 54.4 FT HIGHER THAN USGS.
NOTE: BLANKS INDICATE NON-APPLICABLE OR UNKNOWN.

WELL NUMBER	DATE WELL COMPLETED	DRILLER	DRILLING COMPANY	DRILLING METHOD	WELL TEST-PUMPED?	RI WATER SAMPLES TAKEN?	LAST SAMPLE DATE	MATERIAL SAMPLES TAKEN?	TYPE OF PUMP	REPORTED WELL YIELD (GPM)
DW-101			O'KEEFE	CABLE TOOL		YES	1985		NONE	
DW-102	10/06/82		O'KEEFE	CABLE TOOL		YES	1985		NONE	
DW-103	10/04/82	FROSTY	O'KEEFE	CABLE TOOL		YES	1985		NONE	
DW-105	10/04/82		O'KEEFE	CABLE TOOL		YES	1985		NONE	
DW-106	08/19/80	FROSTY	O'KEEFE	CABLE TOOL		YES	1985		NONE	
DW-107	06/17/77		O'KEEFE	CABLE TOOL		YES	1985	NO	NONE	
DW-108	07/83		MBMG	AUGER		YES	1985	NO	NONE	
DW-109	07/83		MBMG	AUGER		YES	1985	NO	NONE	
DW-110	07/83		MBMG	AUGER		YES	1985	NO	NONE	
DW-111	07/83		MBMG	AUGER		YES	1985	NO	NONE	
DW-112	07/83		MBMG	AUGER		YES	1985	NO	NONE	
DW-113	07/83		MBMG	AUGER		YES	1985	NO	NONE	
DW-114	07/83		MBMG	AUGER		YES	1985	NO	NONE	
DW-115	07/83		MBMG	AUGER		YES	1985	NO	NONE	
DW-116	10/06/82		O'KEEFE	CABLE TOOL		YES	1985	NO	NONE	
DW-117	07/83		MBMG	AUGER		YES	1985		NONE	
DW-118	10/05/82		O'KEEFE	CABLE TOOL		YES	1985	NO	NONE	
DW-119	07/83		MBMG	AUGER		YES	1985	NO	NONE	
DW-120	04/30/83	GERALD	DYNAMITE	CABLE TOOL		NO			SUBMERSIBLE	
DW-121	07/83		MBMG	AUGER		YES	1985	NO	NONE	
DW-122	07/06/83	FAS	MBMG			YES	1985	YES	NONE	
DW-123	07/06/83		MBMG	AUGER		YES	1985	YES	NONE	
DW-124A	07/06/83		MBMG			NO			NONE	
DW-124B	07/06/83	FAS	MBMG			NO			NONE	
DW-124C	07/06/83	FAS	MBMG			NO			NONE	
DW-124D	07/07/83	FAS	MBMG			NO			NONE	
DW-124E	07/07/83	FAS	MBMG	CORED		NO			NONE	
DW-124F	07/07/83					YES	1985		NONE	
DW-124G	07/07/83	FAS	MBMG			YES	1985	NO	NONE	
DW-125	07/07/83	FAS	MBMG			YES	1985		NONE	
DW-127						NO			NONE	
DW-128	09/19/83	FROSTY	O'KEEFE	CABLE TOOL	YES	YES	1985	NO	NONE	15
DW-129		FROSTY	O'KEEFE	CABLE TOOL		YES	1985		SUBMERSIBLE	15
DW-130		ART	MBMG	AUGER		YES	1985	NO	NONE	
DW-131	11/10/82	FROSTY	O'KEEFE	CABLE TOOL		YES	1985		SUBMERSIBLE	
DW-132						YES	1985		SUBMERSIBLE	
DW-133	7/85		MBMG	AIR ROTARY		YES	1985		NONE	
DW-134	1984		MBMG	AUGER		YES	1985		NONE	
DW-135			MBMG			YES	1985		NONE	
DW-136	1984		MBMG	AUGER		YES	1985		NONE	
DW-137	1984	MBMG	MBMG	AUGER		YES	1985	NO	NONE	
DW-138	08/06/85	D.O'KEEFE	O'KEEFE	AIR ROTARY	NO	NO		NO	NONE	
DW-139	08/06/85	D.O'KEEFE	O'KEEFE	AIR ROTARY	NO	NO		NO	NONE	
DW-140	08/03/85	D.O'KEEFE	O'KEEFE	AIR ROTARY	NO	NO		NO	NONE	
DW-141	08/09/85	D.O'KEEFE	O'KEEFE	AIR ROTARY	NO	NO		NO	NONE	

NOTE: BLANKS INDICATE NON-APPLICABLE OR UNKNOWN.

WELL NUMBER	REMARKS	SOURCE OF INVENTORY INFORMATION
DW-101		AMC
DW-102		AMC
DW-103		AMC
DW-105		AMC
DW-106		AMC
DW-107	HYDRAULIC FLUID OBSERVED IN WELL, 01/18/85	AMC
DW-108		MBMG
DW-109	TD 1/85=16.3′	MBMG
DW-110	TD 1/85=10.1′	MBMG
DW-111	TD 1/85=11.7′	MBMG
DW-112		MBMG
DW-113	TD 1/85=14.0′	MBMG
DW-114	TD 1/85=12.4′	MBMG
DW-115	TD 1/85=22.7′	MBMG
DW-116		AMC
DW-117		MBMG
DW-118		AMC
DW-119		MBMG
DW-120	USED ONLY IN SUMMER; HAS PITLESS; GROUTED 0-20′	DNRC
DW-121		MBMG
DW-122		MBMG
DW-123		MBMG
DW-124A	TD 1/85=6.70′	MBMG
DW-124B	TD 1/85=7.60′	MBMG
DW-124C	TD 1/85=16.4′	MBMG
DW-124D	TD 1/85=8.40′	MBMG
DW-124E	TD 1/85=12.30′	MBMG
DW-124F	NO LOG	MDHES
DW-124G		MBMG
DW-125	TD 1/85=18.1′	MBMG
DW-127	INTRASEARCH WELL; NO LOG	INTRASEARCH
DW-128	AT APPARENT FUTURE HOME SITE; 4 IN SCH 40 PVC 35′-66′	O′KEEFE
DW-129	BEHIND MOBILE HOME; 4 IN SCH 40 PVC 10′-86′	DNRC
DW-130		MBMG
DW-131	SWEDE′S AUTO BODY SHOP	DNRC
DW-132	BUTTE STP DEWATERING WELL	BUTTE CITY STP
DW-133		MBMG
DW-134		INTRASEARCH
DW-135		MBMG
DW-136		INTRASEARCH
DW-137		INTRASEARCH
DW-138		EPA
DW-139	ELEVATION OF WELLS BASED ON DATUM W-314	EPA
DW-140	ELEVATION OF WELLS BASED ON DATUM W-314	EPA
DW-141	ELEVATION OF WELL BASED ON DATUM W-314	EPA

ABBREVIATIONS: AMC - ANACONDA MINERALS COMPANY; DNRC - MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION; DSL - MONTANA DEPARTMENT OF STATE LANDS; EPA - ENVIRONMENTAL PROTECTION AGENCY; MBMG - MONTANA BUREAU OF MINES AND GEOLOGY; MDHES - MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES; MP&T - MONTANA POLE AND TREATMENT; S&A - STILLER AND ASSOCIATES, INC.

WELL NUMBER	CROSS REFERENCE WELL NUMBER	LEGAL LOCATION	TOTAL DEPTH DRILLED (FT)	TOTAL DEPTH CASED (FT)	CASING DIAMETER AND TYPE (IN)	GAGE OR WALL THICK-NESS (IN)	BORE-HOLE DIAMETER (IN)	INTERVAL PER-FORATED (FT) AND METHOD (see footnote)		PROBABLE AQUIFER
DW-142	MP&T 85-07	T03N R08W S23 DDA	28	28	4 PVC	SCH 40	7.5	11-28	6	SBC Qal
DW-143	MP&T 85-08	T03N R08W S23 DDA	26	25	4 PVC	SCH 40	7.5	4.5-25	6	SBC Qal
DW-144	MP&T 85-09	T03N R08W S23 DDA	26	26	4 PVC	SCH 40	7.5	12-26	6	SBC Qal
DW-145	MP&T 85-15	T03N R08W S24 CCC	30	30	4 PVC	SCH 40	7.5	12-30	6	SBC Qal
DW-146	MP&T 85-17	T03N R08W S24 CCC	22	22	4 PVC	SCH 40	7.5	12-22	6	SBC Qal
DW-202		T03N R08W S16 CCD	44	44	48 CONCRETE		48			SBC Qal
DW-203		T03N R08W S16 CBC	100	100	6 STEEL	.250	7.5	93-98	3	SBC Qal
DW-204		T03N R08W S17 CCB	58	56	6 STEEL	.250	7.5	51-56	3	SBC Qal
DW-205		T03N R08W S17 CBC	125		6 STEEL	.250		120-123	3	SBC Qal
DW-206		T03N R08W S18 DDA	30		6 STEEL	.250	7.5			SBC Qal
DW-207		T03N R08W S18 DAD	44	43	6	.250	7.5	38-43	3	SBC Qal
DW-208		T03N R08W S18 DDB	50	50	6 STEEL	.250		38-50	3	SBC Qal
DW-210		T03N R08W S18 DCA	55	55	6 STL 0-50'	.250	5'	45-55		SBC Qal
DW-212		T03N R08W S18 CDA	30		6 STEEL					SBC Qal
DW-215		T03N R09W S24 ABC			48 CONCRETE					SBC Qal
DW-218	MBMG WELL G	T03N R09W S24 CBA	53	53	4 PVC	SCH 40	6		4	SBC Qal
DW-219		T03N R09W S23 DAA	225	225	10 STEEL	.250		20-222	3	Ts
DW-220		T03N R09W S23 DAD	280	280	10 STEEL	.250		200-280	3	Ts
DW-221		T03N R09W S23 BAA	88	88	6 STEEL	.250				SBC Qal
DW-222		T03N R09W S14 CDC	113		6 STEEL	.250	7.5	102-111	3	SBC Qal
DW-226		T03N R09W S15 CDA			6 STEEL	.250	7.5			SBC Qal
DW-227		T03N R09W S15 BCC	67	67	6 STEEL	.250	7.5	60-65	3	Tv
DW-229		T03N R09W S16 ACC			6 STEEL	.250				
DW-230		T03N R09W S16 CAA	40		6 STEEL	.250	7.5			
DW-231		T03N R09W S15 DBD	70	70	6 STL 0-60'	.250	0'	57-70	4	Tv
DW-301		T03N R10W S01 CAC	43		6 STEEL	.250	7.5	37-42		SBC Qal
DW-303		T03N R10W S02 BAD					7.5			
DW-304		T04N R10W S35 DCD	90	92	6 STEEL	.250	7.5		2	SBC Qal
DW-306		T03N R09W S06 BBC				.250	7.5			
DW-307		T03N R09W S06 BBB	180		6 STEEL	.250	7.5	50-60		Tv
DW-309		T04N R10W S36 ABC			6 STEEL	.250	7.5			
DW-310		T04N R10W S36 ABC	80	80	6 STEEL	.250	7.5	70-78		SBC Qal
DW-311A		T04N R10W S35 ABA	97	97	6 STEEL	.250		91-96	3	Tal
DW-311B		T04N R10W S35 ABA	68	68	6 STEEL	.250		62-67	3	SBC Qal
DW-312		T04N R10W S26 DDC	85		6 STEEL	.250				
DW-313		T04N R10W S26 DDB	25	25	48	.250			2	SBC Qal
DW-314		T04N R10W S26 CDA			6 STEEL	.250	7.5			
DW-318		T04N R10W S23 CCD	32	32	6 STEEL	.250	7.5	25-30	3	SBC Qal
DW-319		T04N R10W S13 CDC	112	112	6 STEEL	.250	7.5	100-110	7	SBC Qal
DW-320		T04N R10W S25 ABB	66	66	6 STEEL	.250	7.5		1	SBC Qal
DW-321		T04N R10W S13 CCA	138.4	77.7	6 STEEL	.250	7.5	74.8-84.8	7	SBC Qal
DW-322		T04N R10W S23 BBA	450		12 STEEL	.250	12.5		1	Ts
DW-325		T04N R10W S15 DAB	53	53	6 STEEL	.250	7.5	48-53	3	SBC Qal
DW-326		T04N R10W S15 ADD	35		6 STEEL	.250	7.5			SBC Qal
DW-327		T04N R10W S14 BCB	32	32	6 STEEL	.250	7.5	27-32	3	SBC Qal

Notes on perforation methods: 1. Open bottom only. 2. Slotted with Mill's Knife. 3. Slotted with a torch. 4. Saw cut. 5. Factory slotted - 0.030 in. 6. Factory slotted - 0.010 in. 7. Screened and pulled casing.

Notes on aquifers: Qal = Quarternary Alluvium, Tv = Tertiary Volcanics, Tqm = Tertiary Quartz Monzonite, Ts = Tertiary Sediments.

Note: Blanks indicate non-applicable or unknown.

WELL NUMBER	STATIC WATER LEVEL (FT)	DATE MEASURED	MEASURING POINT (MP) DESCRIPTION	MP HEIGHT FROM G.S. (FT)	MEASURING POINT ELEVATION (FT)	HOW DETERMINED?	WELL USE	WELL OWNER	OWNER'S PHONE
DW-142	13.06	8/19/85	TOP OF STEEL	.7	5443.46	SURV/EPA	MONITORING	EPA	
DW-143	7.55	8/19/85	TOP OF STEEL	.7	5435.34	SURV/EPA	MONITORING	EPA	
DW-144	17.02	8/19/85	TOP OF STEEL	.7	5447.70	SURV/EPA	MONITORING	EPA	
DW-145	15.25	8/19/85	TOP OF STEEL	.9	5448.78	SURV/EPA	MONITORING	EPA	
DW-146	DRY	8/19/85	TOP OF STEEL	1.5	5461.12	SURV/EPA	MONITORING	EPA	
DW-202	30	01/07/85	BASMT FLOOR	-7.0	5382	TOPO MAP	DOMESTIC	KING	723-3460
DW-203	53	11/68	CASING TOP		5420	TOPO MAP	PUBLIC SPLY	HUSKY TRK STP	723-7978
DW-204	45.52	03/28/85	CASING TOP	0.4	5395.38	SURV/S&A	DOMESTIC	WENGER	782-6641
DW-205	22	03/28/85	CASING TOP	-6.6	5372.14	SURV/S&A	DOMESTIC	WENGER	782-6641
DW-206					5360	TOPO MAP	DOMESTIC	MARSH	782-6317
DW-207	20	12/76	CASING TOP	1.4	5360	TOPO MAP	DOMESTIC	JOHNSON	782-4997
DW-208	12.1	01/07/85	CASING TOP	1.3	5360	TOPO MAP	DOMESTIC	FROST	782-6713
DW-210	8	01/07/85	CASING TOP	-7.0	5370	TOPO MAP	DOMESTIC	WOLD	782-8215
DW-212					5315	TOPO MAP	DOMESTIC	ERICKSON	782-6258
DW-215	11.5	01/08/85	CASING TOP	-7.0	5345	TOPO MAP	DOMESTIC	BARRY	782-1661
DW-218	36	01/16/85	CASING TOP	1.0	5354	SURV/MBMG	MONITORING	MBMG	496-4157
DW-219	40	10/01/82			5350	TOPO	INDUSTRIAL	STAUFFER CHEM.	782-1215
DW-220	44	10/01/82			5350	TOPO	INDUSTRIAL	STAUFFER CHEM.	728-1315
DW-221	29.4	01/08/85	CASING TOP	2.8	5330	TOPO MAP	SHOP	EARHART	782-0563
DW-222	30	03/77	CASING TOP	2.3	5337	TOPO MAP	PUBLIC SPLY	RAMSAY SCHOOL	
DW-226	18	12/20/84	CASING TOP	0.2	5300	TOPO MAP	DOMESTIC	SCHOONEN	782-1560
DW-227	23.5	03/28/85	CASING TOP	1.3	5305.13	SURV/S&A		TINSLEY	782-5244
DW-229	9.0	01/08/85	CASING TOP	1.3	5275.69	SURV/S&A	DOMESTIC	KONDA	782-5213
DW-230					5315	TOPO MAP	DOMESTIC	MILES	
DW-231	20.6	03/28/85	CASING TOP		5330	TOPO MAP	IRRIGATION	CRAMER	
DW-301	30.0	03/28/85	CASING TOP	-7.0	5145	TOPO MAP	DOMESTIC	TETMAJER	723-3952
DW-303	12.6	02/28/85	CASING TOP	-5.5	5130	TOPO MAP	DOMESTIC	HAYES	797-3241
DW-304	35	09/80	CASING TOP		5120	TOPO MAP	STOCK	PETERSON	797-3327
DW-306	33.5	01/09/85	CASING TOP	-5.8	5185	TOPO MAP	DOMESTIC	BUTORI	797-3504
DW-307	32.5	03/28/85	CASING TOP	0.0	5140	TOPO MAP	DOMESTIC	KELLOG	797-3323
DW-309	61.9	01/04/85	CASING TOP	1.7	5060	TOPO MAP	DOMESTIC	BRIDGEWATER	797-3486
DW-310	65.0	03/28/85	CASING TOP	1.4	5060	TOPO MAP	IRRIGATION	JONES	
DW-311A	46	03/74	CASING TOP		5045	TOPO MAP	DOMESTIC	DANIELS	797-3359
DW-311B	48.8	03/28/85	CASING TOP	1.6	5045	TOPO MAP	STOCK	DANIELS	797-3359
DW-312			CASING TOP		5045	TOPO MAP	DOMESTIC	RIDING	
DW-313	11.5	12/18/84	WELL COVER	0.3	5045	TOPO MAP	DOMESTIC	JOHNSTON	
DW-314	28.8	01/08/85	CASING TOP	1.8	5050	TOPO MAP	DOMESTIC	MILLER	797-3558
DW-318	7.4	04/24/85	CASING TOP	1.9	5060	TOPO MAP	DOMESTIC	DON WELLER	797-3533
DW-319	14.6	03/27/85	CASING TOP	1.6	4985	TOPO MAP	IRRIGATION	MT. HIGHWAYS	
DW-320	42.8	03/27/85	CASING TOP	0.8	4995	TOPO MAP	PUBLIC SPLY	MT. HIGHWAYS	
DW-321	11.1	03/27/85	CASING TOP	0.8	4985	TOPO MAP	IRRIGATION	MT. HIGHWAYS	
DW-322	7.13	02/28/85	CASING TOP	1.3	4930	TOPO MAP	IRRIGATION	FURGESON	797-3707
DW-325	9.6	01/09/85	CASING TOP	1.7	4960	TOPO MAP	DOMESTIC	FIELDS	797-3481
DW-326			CASING TOP		4955	TOPO MAP	DOMESTIC	CAMPBELL	797-3442
DW-327	4.6	04/24/85	CASING TOP	1.6	4950	TOPO MAP	DOMESTIC	DUFFY	797-3773

NOTE: *AMC SURVEY ELEVATIONS ARE REPORTEDLY 54.4 FT HIGHER THAN USGS.
NOTE: BLANKS INDICATE NON-APPLICABLE OR UNKNOWN.

WELL NUMBER	DATE WELL COMPLETED	DRILLER	DRILLING COMPANY	DRILLING METHOD	WELL TEST-PUMPED?	RI WATER SAMPLES TAKEN?	LAST SAMPLE DATE	MATERIAL SAMPLES TAKEN?	TYPE OF PUMP	REPORTED WELL YIELD (GPM)
DW-142	08/06/85	D.O'KEEFE	O'KEEFE	AIR ROTARY	NO	NO		NO	NONE	
DW-143	08/08/85	D.O'KEEFE	O'KEEFE	AIR ROTARY	NO	NO		NO	NONE	
DW-144	08/08/85	D.O'KEEFE	O'KEEFE	AIR ROTARY	NO	NO		NO	NONE	
DW-145	08/12/85	D.O'KEEFE	O'KEEFE	AIR ROTARY	NO	NO		NO	NONE	
DW-146	08/12/85	FROSTY	O'KEEFE	CABLE TOOL	NO	NO		NO	NONE	
DW-202				DUG		YES	1985		EXTERNAL	10
DW-203	11/29/68		O'KEEFE		YES	YES	1985		SUBMERSIBLE	
DW-204				CABLE TOOL		YES	1985		SUBMERSIBLE	20
DW-205	1968		M.S. BARNES		YES	YES	1985		SUBMERSIBLE	
DW-206	1950			CABLE TOOL		YES	1985		EXTERNAL	
DW-207	12/76		O'KEEFE			YES	1985		EXTERNAL	
DW-208	08/11/70		O'KEEFE	CABLE TOOL	YES	YES	1985	NO	SUBMERSIBLE	
DW-210	11/30/73		O'KEEFE	CABLE TOOL	YES	YES	1985	YES	EXTERNAL	30
DW-212	1950			CABLE TOOL		YES	1985		EXTERNAL	
DW-215						YES	1985	NO		
DW-218	06/10/83	SCHMIDT	MBMG		NO	YES	1985		NONE	
DW-219	1954		PRICE LINDSAY		YES	NO			SUBMERSIBLE	400
DW-220	1954		PRICE LINDSAY		YES	NO			SUBMERSIBLE	250
DW-221	11/30/81		O'KEEFE	CABLE TOOL	YES	NO			NONE	
DW-222	1977		O'KEEFE	CABLE TOOL		NO			SUBMERSIBLE	
DW-226						NO			EXTERNAL	
DW-227	1973		O'KEEFE			NO			NONE	
DW-229			MEADE			YES	1985		SUBMERSIBLE	
DW-230						YES	1985			
DW-231	03/1972		O'KEEFE		YES	NO			NONE	
DW-301	1972		O'KEEFE	CABLE TOOL		YES	1985		EXTERNAL	
DW-303						NO			EXTERNAL	
DW-304	1980		O'KEEFE	CABLE TOOL		NO			SUBMERSIBLE	5
DW-306						NO			EXTERNAL	
DW-307	1972		O'KEEFE	CABLE TOOL		NO			SUBMERSIBLE	8
DW-309						YES	1985		EXTERNAL	
DW-310	06/13/84		O'KEEFE	CABLE TOOL	YES	NO	1985		SUBMERSIBLE	20
DW-311A	03/18/74		O'KEEFE	CABLE TOOL		YES		NO		
DW-311B	07/30/79		O'KEEFE	CABLE TOOL	YES	NO		NO	NONE	
DW-312			O'KEEFE			YES	1985		EXTERNAL	
DW-313	1980		OWNER	HAND DUG		NO			EXTERNAL	
DW-314			BRAZILLE			YES			SUBMERSIBLE	
DW-318	03/79		O'KEEFE	CABLE TOOL		YES	1985		SUBMERSIBLE	
DW-319	1973		O'KEEFE	CABLE TOOL		YES	1985		NONE	33
DW-320	1963		O'KEEFE	CABLE TOOL		NO			NONE	38
DW-321			DEPT. OF HWYS.			YES	1985		NONE	
DW-322	1973		O'KEEFE	CABLE TOOL		NO			NONE	
DW-325	06/18/76		O'KEEFE	CABLE TOOL		NO			SUBMERSIBLE	
DW-326			O'KEEFE			NO			EXTERNAL	
DW-327	1977		O'KEEFE	CABLE TOOL		NO			SUBMERSIBLE	20

NOTE: BLANKS INDICATE NON-APPLICABLE OR UNKNOWN.

WELL NUMBER	REMARKS	SOURCE OF INVENTORY INFORMATION
DW-142	ELEVATION OF WELL BASED ON DATUM W-314	EPA
DW-143	ELEVATION OF WELL BASED ON DATUM W-314	EPA
DW-144	ELEVATION OF WELL BASED ON DATUM W-314	EPA
DW-145	ELEVATION OF WELL BASED ON DATUM W-314	EPA
DW-146		EPA
DW-202	EVENING BEST TIME	OWNER
DW-203	WALT BAZZANELLA, OWNER OF TRUCK STOP	O'KEEFE
DW-204	WELL BEHIND HOUSE	MBMG
DW-205	SWL ONLY	MBMG
DW-206	OWNER NOT RECEPTIVE TO SWL MEASUREMENT	
DW-207	OK TO SAMPLE OUTSIDE WHEN NO ONE IS HOME	O'KEEFE
DW-208		
DW-210	OWNER MUST BE HOME FOR SWL AND WQ; 4 IN SCH 40 PVC 43'-55'	
DW-212	SWL AVAILABLE IN SPRING	
DW-215	BEST FOR WQ AND NO SWL; WELL IN BASEMENT	
DW-218	SAME AS MBMG WELL G	MBMG
DW-219		DNRC
DW-220		DNRC
DW-221	CASING LEFT OPEN END; NO LONGER MEASURED	
DW-222	RAMSAY SCHOOL WELL	
DW-226	SWL ONLY	
DW-227	NEEDS BAILER FOR WQ	
DW-229	WELL LOCATED IN KONDA PASTURE	
DW-230	WQ AVAILABLE OUTSIDE HOUSE	
DW-231	SWL ONLY;4 IN SCH 40 PVC 57'-70'	
DW-301	TENANT IS SANDY NORABURY	MBMG
DW-303	SWL ONLY	
DW-304	WQ ONLY, PUMP RUNNING CONSTANTLY	MBMG
DW-306	NO ONE LIVING IN HOUSE; HAZEL SPANGLER OWNER	
DW-307	SWL ONLY	
DW-309		OWNER
DW-310		DNRC
DW-311A	WQ ONLY	MBMG
DW-311B	SWL ONLY	MBMG
DW-312	WQ ONLY	
DW-313	SWL ONLY; 2ND WELL DUG IN BACK	MBMG
DW-314	NO LOG	O'KEEFE
DW-318		MBMG
DW-319	10-A AND I-90 INTERCHANGE, NORTH	MBMG
DW-320	FORMER REST STOP, EAST BOUND ON I-90	MBMG
DW-321	10-A AND I-90 INTERCHANGE, SOUTH	MT. HIGHWAYS
DW-322	SWL ONLY	MBMG
DW-325	SWL ONLY	DNRC
DW-326	SWL ONLY	
DW-327	SWL ONLY	MBMG

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WELL NUMBER	CROSS REFERENCE WELL NUMBER	LEGAL LOCATION	TOTAL DEPTH DRILLED (FT)	TOTAL DEPTH CASED (FT)	CASING DIAMETER AND TYPE (IN)	GAGE OR WALL THICK-NESS (IN)	BORE-HOLE DIAMETER (IN)	INTERVAL PER-FORATED (FT) AND METHOD (see footnote)		PROBABLE AQUIFER
DW-328		T04N R10W S14 BAB	75	75	6 STEEL	.250	7.5	65-75	3	SBC Qal
DW-329		T04N R10W S14 BBA	80	80	6 STEEL	.250	7.5	70-80	3	SBC Qal
DW-333		T04N R10W S10 DDB	60	60	6 STEEL	.250	7.5	10-60	3	SBC Qal
DW-335		T04N R10W S11 CBD			6 STEEL	.250	7.5			
DW-336		T04N R10W S11 CAD			6 STEEL	.250	7.5			
DW-337		T04N R10W S11 CAC	32	32	6 STEEL	.250	7.5	25-30	3	SBC Qal
DW-340	AMC #29	T05N R10W S36 CAC	25	25	6 STEEL	.250	7.5	14-24	3	SBC Qal
DW-341	AMC #81	T05N R10W S36 CAC	86	86	4.5 PVC	SCH 40	7.5	76-86	5	Qal
DW-401	AMC #28	T05N R10W S25 CCB	15	15	6 STEEL	.250	7.5	5-15	3	SBC Qal
DW-403	AMC #70	T05N R10W S24 CCC	30	30	6 STEEL	.250	7.5	22-28	3	SBC Qal
DW-404	AMC #71	T05N R10W S24 CCC	47.5	50	6 STEEL	.250	7.5	35.5-45.5	3	SBC Qal
DW-405		T05N R10W S24 AAA	200	200	30 STL 0-60	.250		195-200	7	Ts
DW-407		T05N R10W S17 BCC	90	90	6 STEEL	.250	7.5	84-89	3	SBC Qal
DW-408		T05N R09W S20 BAB	128	128	6 STEEL	.250	7.5	122-126	3	SBC Qal
DW-411	AMC #61	T05N R10W S23 CDD	100	100	6 STEEL	.250	7.5	94-98	3	SBC Qal
DW-412	AMC #80	T05N R10W S25 DBD	56	56	4.5 PVC	SCH 40	7.5	46-56	5	Qal
DW-414	AMC #78	T05N R10W S25 ABA	20	20	4.5 PVC	SCH 40	7.5	10-20	5	Qal
DW-415	AMC #77	T05N R10W S24 CCCD	70	68	4.5 PVC	SCH 40	7.5	58-68	5	Qal
DW-416	AMC #79	T05N R10W S26	15	15	4.5 PVC	SCH 40	7.5	5-15	5	Qal
DW-501		T05N R09W S08 BCA	30	30	6 STEEL	.250	7.5			
DW-502A		T05N R09W S05 CDB	31	31	6 STEEL	.250	7.5	24-29	3	CFR Qal
DW-502B		T05N R09W S05 CDB			6 STEEL	.250	7.5			CFR Qal
DW-502C		T05N R09W S05 CDA	103	103	6 STEEL	.250	7.5	93-103	3	Ts
DW-504		T06N R09W S21 BBA	60		6 STEEL	.250	7.5			CFR Qal
DW-505		T06N R09W S16 CCC							3	CFR Qal
DW-507A		T06N R09W S17 ADB			6 STEEL	.250	7.5			CFR Qal
DW-507B		T06N R09W S17 ADB	58	58	6 STEEL	.250	7.5	51-56	3	CFR Qal
DW-509		T06N R09W S09 DCB	37	37	6 STEEL	.250	7.5			CFR Qal
DW-510		T06N R09W S09 DDA	73	73	6 STEEL	.250	7.5	66-71	3	CFR Qal
DW-511		T06N R09W S09 DAD	67	67	6 STEEL	.250	7.5	62-67	3	CFR Qal
DW-512		T06N R09W S09 DBC	38	38	6 STEEL	.250	7.5	32-36	3	CFR Qal
DW-514		T06N R09W S08 ADD	31	31	6 STEEL	.250	7.5	24-29	3	CFR Qal
DW-517		T06N R09W S09 BAB	31	31	6 STEEL	.250	7.5	24-29	1	CFR Qal
DW-518		T06N R09W S05 DDA	66	66	6 STEEL	.250	7.5	59-64	3	CFR Qal
DW-519		T06N R09W S04 DDA	54	54	6 STEEL	.250	7.5	47-52	3	CFR Qal
DW-520		T06N R09W S04 DDB	70	70	6 STEEL	.250	7.5	63-68	3	CFR Qal
GS-01		T03N R08W S17 CDD	14.6	14.6	4 PVC	SCH 40	7.5	9.5-14.5	5	SBC Qal
GS-02		T03N R08W S17 CDD	6.2	6.2	4 PVC	SCH 40	7.5	1.2-6.2	5	SBC Qal
GS-03		T03N R09W S13 DCB	23	23	4 PVC	SCH 40	7.5	13-23	5	SBC Qal
GS-04		T03N R09W S13 DCB	8	8	4 PVC	SCH 40	7.5	3-8	5	SBC Qal
GS-05		T03N R09W S16 BCD	35	29	4 PVC	SCH 40	7.5	19-29	5	SBC Qal
GS-06		T03N R09W S16 BDC	31	29	4 PVC	SCH 40	7.5	19-29	5	SBC Qal
GS-07		T03N R07W S19 AAC	180'	160'	4 PVC	SCH 40	7.5	130-160	5	SBC Qal
GS-08		T03N R07W S19 CBAD	151	145.5	4 PVC	SCH 40	7.5	125.5-145.5	5	SBC Qal
GS-09		T03N R07W S19 CBAD	75.5	75.5	4 PVC	SCH 40	7.5	60.5-75.5	5	SBC Qal

Notes on perforation methods: 1. Open bottom only. 2. Slotted with Mill's Knife. 3. Slotted with a torch. 4. Saw cut. 5. Factory slotted - 0.030 in. 6. Factory slotted - 0.010 in. 7. Screened and pulled casing.

Notes on aquifers: Qal = Quarternary Alluvium, Tv = Tertiary Volcanics, Tqm = Tertiary Quartz Monzonite, Ts = Tertiary Sediments.

Note: Blanks indicate non-applicable or unknown.

WELL NUMBER	STATIC WATER LEVEL (FT)	DATE MEASURED	MEASURING POINT (MP) DESCRIPTION	MP HEIGHT FROM G.S. (FT)	MEASURING POINT ELEVATION (FT)	HOW DETERMINED?	WELL USE	WELL OWNER	OWNER'S PHONE
DW-328	3.0	02/81	CASING TOP		4938	TOPO MAP	DOMESTIC	MEADE	797-3422
DW-329	6.7	07/10/85	CASING TOP	1.4	4940	TOPO MAP	IRRIGATION	MEADE	797-3422
DW-333	7.7	03/27/85	CASING TOP	0.7	4950	TOPO MAP	IRRIGATION	HEWITT	797-3704
DW-335	3.1	03/27/85	CASING TOP	.9	4945	TOPO MAP	DOMESTIC	O'BRIAN	797-3464
DW-336			CASING TOP		4930	TOPO MAP	DOMESTIC	GATES	797-3917
DW-337	7.8	04/24/85	CASING TOP	.8	4934	TOPO MAP	DOMESTIC	COSTLE	797-3485
DW-340	8.3	01/17/85	CASING TOP	2.9	4893	SURV/AMC	MONITORING	AMC	797-3449
DW-341	10.0	12/16/85	TOP OF STEEL	1.8	4882.0	SURV/AMC	MONITORING	AMC	723-4311
DW-401	6.3	01/17/85	CASING TOP	2.5	4891	SURV/AMC	MONITORING	AMC	797-3449
DW-403	8.1	07/10/85	CASING TOP	2.6	4875	TOPO MAP	MONITORING	AMC	797-3449
DW-404	12.4	07/10/85	CASING TOP	2.6	4875	TOPO MAP	MONITORING	AMC	797-3449
DW-405	19.7	04/24/85	CASING TOP	2.0	4825	TOPO MAP	INSTITUTIONAL	STATE HOSPITAL	693-7010
DW-407	68.3	01/08/85	CASING TOP	1.6	4860	TOPO MAP	DOMESTIC	BECK	693-2307
DW-408	88	06/72	CASING TOP		4880	TOPO MAP	DOMESTIC	PETERSON	693-2460
DW-411	32.5	03/27/85	CASING TOP	0.7	4892	TOPO MAP	DOMESTIC	JOHNSON	693-2448
DW-412	9.2	12/12/85	TOP OF STEEL	2.4	4868.7	SURV/AMC	MONITORING	AMC	723-4311
DW-414	9.2	12/17/85	TOP OF STEEL	2.2		SURV/AMC	MONITORING	AMC	723-4311
DW-415	13.0	12/16/85	TOP OF STEEL		4875	SURV/AMC	MONITORING	AMC	723-4311
DW-416	7.2	12/17/85	TOP OF STEEL	2.55	4889	SURV/AMC	MONITORING	AMC	723-4311
DW-501	4.0		CASING TOP		4790	TOPO MAP	DOMESTIC	PERKINS	
DW-502A	16.0	07/10/85	CASING TOP	1.5	4785	TOPO MAP	DOMESTIC	LAMPERT	693-2396
DW-502B	20.3	01/08/85	CASING TOP	1.3	4788	TOPO MAP	DOMESTIC	LAMPERT	693-2396
DW-502C	75.6	01/08/85	CASING TOP	1.6	4840	TOPO MAP	DOMESTIC	LAMPERT	693-2396
DW-504	20.9	01/08/85	CASING TOP	-10.0	4700	TOPO MAP	DOMESTIC	KELLICUT	693-2327
DW-505			CASING TOP		4680	TOPO MAP	DOMESTIC	BECK	
DW-507A	4.4	01/08/85	CASING TOP	1.3	4690	TOPO MAP	DOMESTIC	McGHEE	846-3824
DW-507B	14.5	01/08/85	CASING TOP	1.4	4690	TOPO MAP	PUBLIC	RACETRK FIREH	846-2852
DW-509	6.22	12/19/84	CASING TOP	0.5	4640	TOPO MAP	DOMESTIC	WALKER	846-1617
DW-510	29.0	03/27/85	CASING TOP	1.3	4690	TOPO MAP	DOMESTIC	FORD	846-3423
DW-511	49.0	03/27/85	CASING TOP	1.3	4620	TOPO MAP	DOMESTIC	WHEELER	846-1029
DW-512	7.6	03/27/85	CASING TOP	1.0	4645	TOPO MAP	DOMESTIC	WABER	846-2505
DW-514	7.1	03/27/85	CASING TOP	1.4	4680	TOPO MAP	DOMESTIC	TROTTER	846-3309
DW-517	5.6	03/27/85	CASING TOP	1.5	4650	TOPO MAP	DOMESTIC	REEVES	846-3451
DW-518	14.8	03/27/85	CASING TOP	1.5	4655	TOPO MAP	DOMESTIC	WALDEN	846-3689
DW-519	54.6	03/01/85	CASING TOP	1.8	4650	TOPO MAP	DOMESTIC	STURM	563-7420
DW-520	25	07/30/85	CASING TOP	2	4640	TOPO MAP	DOMESTIC	PEMBERTON	846-3305
GS-01	3.6	12/28/84	CASING TOP	1.5	5360.48	SURV/S&A	MONITORING	SBC CERCLA	
GS-02	3.42	04/18/85	TOP OF PVC	2.1	5360.62	SURV/S&A	MONITORING	SBC CERCLA	
GS-03	6.39	04/18/85	FLOOR OF HOUSIN	1.2	5325.71	SURV/S&A	MONITORING	SBC CERCLA	
GS-04	7.6	04/18/85	FLOOR OF HOUSIN	1.3	5325.70	SURV/S&A	MONITORING	SBC CERCLA	
GS-05	8.3	03/15/85	TOP OF STEEL	1.9	5271.34	SURV/S&A	MONITORING	SBC CERCLA	
GS-06	8.2	03/15/85	TOP OF STEEL	1.9	5271.42	SURV/S&A	MONITORING	SBC CERCLA	
GS-07	25.60	11-27-85	TOP OF STEEL	2.2	5479.89	SURV/S&A	MONITORING	SBC CERCLA	
GS-08	12.44	11-26-85	TOP OF STEEL	1.5	5458.02	SURV/S&A	MONITORING	SBC CERCLA	
GS-09	10.85	11-27-85	TOP OF STEEL	1.0	5457.78	SURV/S&A	MONITORING	SBC CERCLA	

NOTE: *AMC SURVEY ELEVATIONS ARE REPORTEDLY 54.4 FT HIGHER THAN USGS.

NOTE: BLANKS INDICATE NON-APPLICABLE OR UNKNOWN.

WELL NUMBER	DATE WELL COMPLETED	DRILLER	DRILLING COMPANY	DRILLING METHOD	WELL TEST-PUMPED?	RI WATER SAMPLES TAKEN?	LAST SAMPLE DATE	MATERIAL SAMPLES TAKEN?	TYPE OF PUMP	REPORTED WELL YIELD (GPM)
DW-328	02/20/81		MEADE	CABLE TOOL	YES	YES	1985		SUBMERSIBLE	
DW-329			MEADE	CABLE TOOL		YES	1985		NONE	
DW-333	1974		O'KEEFE	CABLE TOOL		NO			SUBMERSIBLE	
DW-335						NO			SUBMERSIBLE	
DW-336			WROBLE			YES	1985		EXTERNAL	
DW-337	10/25/79	FROSTY	O'KEEFE	CABLE TOOL	YES	YES	1985		EXTERNAL	
DW-340	07/74		NORTH. TEST.		YES	YES	1985		NONE	15
DW-341	03/85	FROSTY	O'KEEFE	CABLE TOOL		YES	1985			
DW-401	07/74		NORTH. TEST.		YES	YES	1985		NONE	5
DW-403	10/04/83	FROSTY	O'KEEFE	CABLE TOOL		YES	1985		NONE	5
DW-404	10/05/83	FROSTY	O'KEEFE	CABLE TOOL		YES	1985		NONE	
DW-405	1958		O'KEEFE	CABLE TOOL		YES	1985		EXTERNAL	1000
DW-407	04/72		O'KEEFE	CABLE TOOL		NO			SUBMERSIBLE	
DW-408	1972		O'KEEFE	CABLE TOOL		YES	1985		SUBMERSIBLE	30
DW-411	05/73		MEADE	CABLE TOOL	YES	YES	1985		SUBMERSIBLE	20
DW-412	03/85	FROSTY	O'KEEFE	CABLE TOOL		YES	1985		NONE	
DW-414	03/85	FROSTY	O'KEEFE	CABLE TOOL		YES	1985			
DW-415	03/85	FROSTY	O'KEEFE	CABLE TOOL		YES	1985		NONE	
DW-416	03/85	FROSTY	O'KEEFE	CABLE TOOL		YES	1985			
DW-501	1946					YES	1985		SUBMERSIBLE	
DW-502A	1978		O'KEEFE	CABLE TOOL		YES	1985		SUBMERSIBLE	
DW-502B	12/78		O'KEEFE	CABLE TOOL		NO			SUBMERSIBLE	15
DW-502C	12/83		O'KEEFE	CABLE TOOL		NO			SUBMERSIBLE	
DW-504	1936					YES	1985		EXTERNAL	3
DW-505						YES	1985		EXTERNAL	
DW-507A						NO			NONE	
DW-507B			O'KEEFE			NO			SUBMERSIBLE	
DW-509	PRE/74					NO			EXTERNAL	
DW-510	05/24/84		O'KEEFE	CABLE TOOL	YES	NO			SUBMERSIBLE	
DW-511	1977		O'KEEFE			NO			SUBMERSIBLE	
DW-512	1973		O'KEEFE			NO			SUBMERSIBLE	
DW-514	1981		O'KEEFE	CABLE TOOL		NO			SUBMERSIBLE	60
DW-517	1981		O'KEEFE			NO			SUBMERSIBLE	
DW-518	1972		O'KEEFE			NO		NO	SUBMERSIBLE	
DW-519	06/07/84		O'KEEFE	CABLE TOOL	YES	NO			SUBMERSIBLE	
DW-520	07/30/84	O'KEEFE	O'KEEFE	CABLE TOOL	YES	NO			EXTERNAL	
GS-01	12/28/84	FROSTY	O'KEEFE	CABLE TOOL	YES	YES	1985	YES	NONE	
GS-02	12/28/84	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	NO	NONE	
GS-03	12/26/84	FROSTY	O'KEEFE	CABLE TOOL	YES	YES	1985	YES	NONE	
GS-04	12/26/84	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	NO	NONE	
GS-05	03/15/85	JIM ORR	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
GS-06	03/15/85	JIM ORR	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
GS-07	11-26-85	MIKE O.	O'KEEFE	CABLE TOOL	YES	YES	1985	YES	NONE	20.5 GPM
GS-08	11-25-85	FROSTY	O'KEEFE	CABLE TOOL	YES	YES	1985	YES	NONE	10.75 GPM
GS-09	11-27-85	FROSTY	O'KEEFE	CABLE TOOL	YES	YES	1985	YES	NONE	10 GPM

NOTE: BLANKS INDICATE NON-APPLICABLE OR UNKNOWN.

WELL NUMBER	REMARKS	SOURCE OF INVENTORY INFORMATION
DW-328		DNRC
DW-329	SWL ONLY PRESENTLY	
DW-333	SWL ONLY; CALL FIRST	MBMG
DW-335	SWL ONLY NAME ON MAILBOX IS STEIGER	COUNTY RECORDER
DW-336	WQ ONLY	
DW-337		MBMG
DW-340		AMC
DW-341		TETRA TECH
DW-401		AMC
DW-403		AMC
DW-404		AMC
DW-405	CONTACT TOM McCARTHY ADMIN. BLDG; 12 IN STEEL 0-200'	MBMG
DW-407	SWL ONLY	MBMG
DW-408	WQ ONLY	MBMG
DW-411		AMC
DW-412		TETRA TECH
DW-414		TETRATECH
DW-415		TETRA TECH
DW-416		TETRA TECH
DW-501	WQ ONLY RENTERS NAME IS LAUGHAN	
DW-502A	RED WELL NEAR CORRAL WQ AND SWL	
DW-502B	AT WHITE HOUSE SWL ONLY	
DW-502C	NEW BRICK HOUSE SWL ONLY	
DW-504		
DW-505	TENNANT DICK BOGGESS WQ ONLY	
DW-507A	GEM BAR AT YELLOW COTTAGE	
DW-507B		
DW-509	SWL ONLY	MBMG
DW-510	SWL ONLY	MBMG
DW-511	SWL ONLY	MBMG
DW-512	SWL ONLY	DNRC
DW-514	SWL ONLY	DNRC
DW-517	SWL ONLY	
DW-518	SWL ONLY	DNRC
DW-519	SWL ONLY	O'KEEFE
DW-520	SWL ONLY	
GS-01	1/2 MILE WEST OF ROCKER, 10 FT NORTH OF SILVER BOW CREEK	STILLER & ASSOC
GS-02	8 FT EAST OF GS-01	STILLER & ASSOC
GS-03	NORTH OF SILVER BOW CREEK, NEAR THE TOWN OF SILVER BOW	STILLER & ASSOC
GS-04	10 FT EAST OF GS-03	STILLER & ASSOC
GS-05	MILES CROSSING, KONDA RANCH, APPROX. 75 FT NORTH OF SS-14	STILLER & ASSOC
GS-06	150 FT EAST OF GS-05	STILLER & ASSOC
GS-07	BEHIND BUTTE SBC COUNTY SHOP	STILLER & ASSOC
GS-08	SOUTH OF BUTTE MSD NEAR GEORGE AND UTAH	STILLER & ASSOC
GS-09	SOUTH OF BUTTE MSD NEAR GEORGE AND UTAH	STILLER & ASSOC

ABBREVIATIONS: AMC - ANACONDA MINERALS COMPANY; DNRC - MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION; DSL - MONTANA DEPARTMENT OF STATE LANDS; EPA - ENVIRONMENTAL PROTECTION AGENCY; MBMG - MONTANA BUREAU OF MINES AND GEOLOGY; MDHES - MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES; MP&T - MONTANA POLE AND TREATMENT; S&A - STILLER AND ASSOCIATES, INC.

WELL NUMBER	CROSS REFERENCE WELL NUMBER	LEGAL LOCATION	TOTAL DEPTH DRILLED (FT)	TOTAL DEPTH CASED (FT)	CASING DIAMETER AND TYPE (IN)	GAGE OR WALL THICK-NESS (IN)	BORE-HOLE DIAMETER (IN)	INTERVAL PER-FORATED (FT) AND METHOD (see footnote)		PROBABLE AQUIFER
GS-10A		T03N R07W S19 AAC	110	110	2 PVC	SCH 40	7.5	100-110	6	SBC Qal
GS-10B		T03N R07W S19 AAC	29	29	2 PVC	SCH 40	7.5	19-29	6	SBC Qal
GS-11		T03N R07W S19 CBAD	18	18	2 PVC	SCH 40	7.5	8-18	6	SBC Qal
GS-12		T03N R08W S24 CAD	29.5	29.5	2 PVC	SCH 40	7.5	19.5-29.5	6	SBC Qal
GS-13A		T03N R08W S24 CBA	30.5	17.5	4 PVC	SCH 40	7.5	12.5-17.5	5	SBC Qal
GS-13B		T03N R08W S24 CBA	34	34	6 STEEL	SCH 40	7.5	24-28	2	SBC Qal
GS-14		T03N R07W S19 CCD	62	62	2 PVC	SCH 40	7.5	52-62	6	SBC Qal
GS-15A		T03N R08W S24 CAB	32	32	2 PVC	SCH 40	7.5	27-32	6	SBC Qal
GS-15B		T03N R08W S24 CAB	15	15	2 PVC	SCH 40	7.5	0-15	6	SBC Qal
TS-01		T03N R09W S22 AAD	26.5	26.5	4 PVC	SCH 40	7.5	16.5-26.5	5	SBC Qal
TS-02		T03N R09W S22 AAD	7.6	7.6	4 PVC	SCH 40	7.5	0-7.6	5	SBC Qal
TS-03		T03N R09W S22 AAD	27	26.5	2 PVC	SCH 40	7.5	16.5-26.5	5	SBC Qal
TS-04		T03N R09W S22 AAD	27	26	2 PVC	SCH 40	7.5	16-26	5	SBC Qal
TS-05		T03N R09W S22 AAD	27	27	2 PVC	SCH 40	7.5	16-26	5	SBC Qal
TS-06		T03N R09W S22 AAD	8	7.0	2 PVC	SCH 40	7.5	2-7	5	SBC Qal
TS-07		T03N R09W S22 AAD	7.5	7.0	2 PVC	SCH 40	7.5	2-7	5	SBC Qal
TS-08		T03N R09W S22 AAD	3.5	NA	NA	NA	7.5	3.25-3.75		SBC Qal
TS-09		T03N R09W S22 AAD	5.5	NA	NA	NA	7.5	5.25-5.75		SBC Qal
TS-10		T03N R09W S22 AAD	7.5	NA	NA	NA	7.5	7.25-7.75		SBC Qal
TS-11		T03N R09W S22 AAD	9.5	NA	NA	NA	7.5	9.25-9.75		SBC Qal
TS-12		T03N R09W S22 AAD	10	10	2 PVC	SCH 40	4	8-10	4	SBC Qal
TS-13		T03N R09W S22 AAD	10	10	2 PVC	SCH 40	4	8-10	4	SBC Qal
TS-14		T03N R09W S22 ABA	6.8	NA	NA	NA	4	6.3-6.8		SBC Qal
TS-15		T03N R09W S22 ABA	4.8	NA	NA	NA	4	4.3-4.8		SBC Qal
TS-16		T03N R09W S22 ABA	2.0	NA	NA	NA	4	1.7-2.0		SBC Qal
WSP-1		T04N R10W S01 CBD	79	79	4 PVC	SCH 40	7.5	69-79	5	SBC Qal
WSP-2A		T05N R09W S19 AA	68	67	2 PVC	SCH 40	7.5	62-67	6	SBC Qal
WSP-2B		T05N R09W S19 AA	15	15	2 PVC	SCH 40	7.5	5-15	6	SBC Qal
WSP-3A		T05N R09W S18 DDC	75	74	2 PVC	SCH 40	7.5	69-74	6	SBC Qal
WSP-3B		T05N R09W S18 DDC	42	42	2 PVC	SCH 40	7.5	32-42	6	SBC Qal
WSP-4		T05N R09W S18 DBC	38	38	4 PVC	SCH 40	7.5	33-38	5	SBC Qal
WSP-5		T05N R09W S18 DBC	20	20	4 PVC	SCH 40	7.5	15-20	5	SBC Qal

Notes on perforation methods: 1. Open bottom only. 2. Slotted with Mill's Knife. 3. Slotted with a torch. 4. Saw cut. 5. Factory slotted - 0.030 in. 6. Factory slotted - 0.010 in. 7. Screened and pulled casing.
Notes on aquifers: Qal = Quarternary Alluvium, Tv = Tertiary Volcanics, Tqm = Tertiary Quartz Monzonite, Ts = Tertiary Sediments.
Note: Blanks indicate non-applicable or unknown.

WELL NUMBER	STATIC WATER LEVEL (FT)	STATIC WATER LEVEL DATE MEASURED	MEASURING POINT (MP) DESCRIPTION	MP HEIGHT FROM G.S. (FT)	MEASURING POINT ELEVATION (FT)	MEASURING POINT HOW DETERMINED?	WELL USE	WELL OWNER	OWNER'S PHONE
GS-10A	20.3	12-18-85	TOP OF STEEL	.8	5477.94	SURV/S&A	MONITORING	SBC CERCLA	
GS-10B	19.9	12-18-85	TOP OF STEEL	.8	5477.94	SURV/S&A	MONITORING	SBC CERCLA	
GS-11	11.04	12-03-85	TOP OF STEEL	1.2	5457.55	SURV/S&A	MONITORING	SBC CERCLA	
GS-12	11.04	12-03-85	TOP OF STEEL	1.5	5442.74	SURV/S&A	MONITORING	SBC CERCLA	
GS-13A	6.2	12-18-85	TOP OF STEEL	1.6	5441.15	SURV/S&A	MONITORING	SBC CERCLA	
GS-13B	5.75	12-19-85	TOP OF STEEL	.5	5440.64	SURV/S&A	MONITORING	SBC CERCLA	
GS-14	9.3	12-20-85	TOP OF STEEL	1.6	5455.23	SURV/S&A	MONITORING	SBC CERCLA	
GS-15A	9.48	12-17-85	TOP OF STEEL	.9	5445.28	SURV/S&A	MONITORING	SBC CERCLA	
GS-15B	9.75	12-17-85	TOP OF STEEL	.9	5445.28	SURV/S&A	MONITORING	SBC CERCLA	
TS-01	9.8	03/28/85	FLOOR OF HOUSIN	1.5	5297.73	SURV/S&A	MONITORING	SBC CERCLA	
TS-02	9.8	03/28/85	FLOOR OF HOUSIN	1.5	5297.43	SURV/S&A	MONITORING	SBC CERCLA	
TS-03	9.7	03/15/85	TOP OF STEEL	2.1	5297.48	SURV/S&A	MONITORING	SBC CERCLA	
TS-04	9.5	03/14/85	TOP OF PVC	2.0	5297.19	SURV/S&A	MONITORING	SBC CERCLA	
TS-05	9.9	03/15/85	TOP OF STEEL	2.4	5297.58	SURV/S&A	MONITORING	SBC CERCLA	
TS-06	9.75	03/18/85	TOP OF STEEL	2.5	5297.47	SURV/S&A	MONITORING	SBC CERCLA	
TS-07	9.7	03/18/85	TOP OF STEEL	2.4	5297.65	SURV/S&A	MONITORING	SBC CERCLA	
TS-08	NA	NA	NA	NA	NA		LYSIMETER	SBC CERCLA	
TS-09	NA	NA	NA	NA	NA		LYSIMETER	SBC CERCLA	
TS-10	NA	NA	NA	NA	NA		LYSIMETER	SBC CERCLA	
TS-11	NA	NA	NA	NA	NA		LYSIMETER	SBC CERCLA	
TS-12	8.5	04/02/85	TOP OF STEEL	.8	5296.64	SURV/S&A	MONITORING	SBC CERCLA	
TS-13	6.7	04/02/85	TOP OF PVC	.8	5294.4	SURV/S&A	MONITORING	SBC CERCLA	
TS-14	NA	NA	NA	NA	NA		LYSIMETER	SBC CERCLA	
TS-15	NA	NA	NA	NA	NA		LYSIMETER	SBC CERCLA	
TS-16	NA	NA	NA	NA	NA		LYSIMETER	SBC CERCLA	
WSP-1	1.5	12-06-85	TOP OF STEEL	3.0	4888.66	SURV/S&A	MONITORING	SBC CERCLA	
WSP-2A	2.82	12-11-85	TOP OF STEEL	1.5	4802.31	SURV/S&A	MONITORING	SBC CERCLA	
WSP-2B	4.71	12-11-85	TOP OF STEEL	1.5	4802.31	SURV/S&A	MONITORING	SBC CERCLA	
WSP-3A	5.59	12-13-85	TOP OF STEEL	2.0	4801.93	SURV/S&A	MONITORING	SBC CERCLA	
WSP-3B	5.02	12-13-85	TOP OF STEEL	2.0	4801.93	SURV/S&A	MONITORING	SBC CERCLA	
WSP-4	6.4	12-19-85	TOP OF STEEL	2.0	4793.51	SURV/S&A	MONITORING	SBC CERCLA	
WSP-5	6.7	12-17-85	TOP OF STEEL	1.7	4793.52	SURV/S&A	MONITORING	SBC CERCLA	

NOTE: *AMC SURVEY ELEVATIONS ARE REPORTEDLY 54.4 FT HIGHER THAN USGS.
NOTE: BLANKS INDICATE NON-APPLICABLE OR UNKNOWN.

WELL NUMBER	DATE WELL COMPLETED	DRILLER	DRILLING COMPANY	DRILLING METHOD	WELL TEST-PUMPED?	RI WATER SAMPLES TAKEN?	LAST SAMPLE DATE	MATERIAL SAMPLES TAKEN?	TYPE OF PUMP	REPORTED WELL YIELD (GPM)
GS-10A	12-04-85	MIKE O.	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
GS-10B	12-04-85	MIKE O.	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
GS-11	12-03-85	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
GS-12	12-04-85	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
GS-13A	12-06-85	MIKE O.	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
GS-13B	12-06-85	MIKE O.	O'KEEFE	CABLE TOOL	YES	YES	1985	YES	NONE	3 GPM
GS-14	12-12-85	MIKE O.	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
GS-15A	12-16-85	MIKE O.	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
GS-15B	12-16-85	MIKE O.	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
TS-01	03/13/85	JIM ORR	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
TS-02	03/13/85	JIM ORR	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
TS-03	03/14/85	JIM ORR	O'KEEFE	CABLE TOOL	NO	NO		YES	NONE	
TS-04	03/14/85	JIM ORR	O'KEEFE	CABLE TOOL	NO	NO		YES	NONE	
TS-05	03/14/85	JIM ORR	O'KEEFE	CABLE TOOL	NO	NO		YES	NONE	
TS-06	03/15/85	JIM ORR	O'KEEFE	CABLE TOOL	NO	NO		YES	NONE	
TS-07	03/15/85	JIM ORR	O'KEEFE	CABLE TOOL	NO	NO		YES	NONE	
TS-08	03/13/85	JIM ORR	O'KEEFE	CABLE TOOL	NA	NO		YES	NONE	
TS-09	03/13/85	JIM ORR	O'KEEFE	CABLE TOOL	NA	NO		YES	NONE	
TS-10	03/13/85	JIM ORR	O'KEEFE	CABLE TOOL	NA	YES	1985	YES	NONE	
TS-11	03/14/85	JIM ORR	O'KEEFE		NA	YES	1985	YES	NONE	
TS-12	04/02/85	RB/PD	STILLER	AUGER	NO	NO		NO	NONE	
TS-13	04/02/85	RB/PD	STILLER	AUGER	NO	NO		NO	NONE	
TS-14	06-12-85	RB	STILLER	BUCKET AUG	NA	YES	1985	NO	NONE	
TS-15	6-12-85	RB	STILLER	BUCKET AUG	NA	YES	1985	NO	NONE	
TS-16	6-12-85	RB	STILLER	BUCKET AUG	NA	YES	1985	NO	NONE	
WSP-1	12-06-85	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
WSP-2A	12-10-85	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
WSP-2B	12-10-85	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
WSP-3A	12-13-85	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
WSP-3B	12-13-85	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
WSP-4	12-16-85	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	
WSP-5	12-17-85	FROSTY	O'KEEFE	CABLE TOOL	NO	YES	1985	YES	NONE	

NOTE: BLANKS INDICATE NON-APPLICABLE OR UNKNOWN.

WELL NUMBER	REMARKS	SOURCE OF INVENTORY INFORMATION
GS-10A	BEHIND BUTTE SBC COUNTY SHOP, DEEEPER OF THE DUAL COMPLETION.	STILLER & ASSOC
GS-10B	BEHIND BUTTE SBC COUNTY SHOP, SHALLOWER OF THE DUAL COMPLETION.	STILLER & ASSOC
GS-11	SOUTH OF BUTTE MSD NEAR GEORGE AND UTAH.	STILLER & ASSOC
GS-12	SOUTH OF CENTENNIAL DRIVE NEAR THE OLD MSLA GULCH CHANNEL.	STILLER & ASSOC
GS-13A	SOUTH OF CENTENNIAL DRIVE NEAR THE OLD MN REDUCTION PLANT, NORTH OF SBC	STILLER & ASSOC
GS-13B	SOUTH OF CENTENNIAL DRIVE NEAR THE OLD MN REDUCTION PLANT, NORTH OF SBC	STILLER & ASSOC
GS-14	SOUTH OF BUTTE MSD NEAR MARCIA AND UTAH ON CATHOLIC CHURCH PROPERTY.	STILLER & ASSOC
GS-15A	SOUTH OF SBC ON SITE OF OLD MN REDUCTION PLANT ADJACENT TO OLD AMC DIESL	STILLER & ASSOC
GS-15B	SOUTH OF SBC ON SITE OF OLD MN REDUCTION PLANT ADJACENT TO OLD AMC DIESL	STILLER & ASSOC
TS-01	LOCATED ON RAMSAY FLATS	STILLER & ASSOC
TS-02	8 FT SOUTH OF TS-01	STILLER & ASSOC
TS-03	10 FT WEST OF TS-01	STILLER & ASSOC
TS-04	40 FT WEST OF TS-01	STILLER & ASSOC
TS-05	20 FT SOUTH OF TS-01	STILLER & ASSOC
TS-06	15 FT SOUTH OF TS-02	STILLER & ASSOC
TS-07	15 FT EAST OF TS-02	STILLER & ASSOC
TS-08	20 FT SOUTHWEST OF TS-04	STILLER & ASSOC
TS-09	6 FT WEST OF TS-08	STILLER & ASSOC
TS-10	6 FT WEST OF TS-09	STILLER & ASSOC
TS-11	6 FT WEST OF TS-10	STILLER & ASSOC
TS-12	300 FT SOUTH OF TS-01	STILLER & ASSOC
TS-13	300 FT WEST OF TS-01	STILLER & ASSOC
TS-14	APPROX. 600 FT WEST OF TS-01	STILLER & ASSOC
TS-15	6 FT WEST OF TS-14	STILLER & ASSOC
TS-16	6 FT WEST OF TS-15	STILLER & ASSOC
WSP-1	UPGRAD. OF POND THREE NEAR UPPER pH SHACK.	STILLER & ASSOC
WSP-2A	DOWNGRAD. OF POND ONE.EASTERN WELL, DEEPER OF THE DUAL COMPLETION.	STILLER & ASSOC
WSP-2B	DOWNGRAD. OF POND ONE.EASTERN WELL, SHALLOWER OF THE DUAL COMPLETION.	STILLER & ASSOC
WSP-3A	DOWNGRAD. OF POND ONE.WESTERN WELL, DEEPER OF THE DUAL COMPLETION.	STILLER & ASSOC
WSP-3B	DOWNGRAD. OF POND ONE.WESTERN WELL, SHALLOWER OF THE DUAL COMPLETION.	STILLER & ASSOC
WSP-4	DOWNGRAD. OF POND ONE,NEAR OLD AMC GAGING STATION.	STILLER & ASSOC
WSP-5	DOWNGRAD. OF POND ONE,NEAR OLD AMC GAGING STATION.	STILLER & ASSOC

ABBREVIATIONS: AMC - ANACONDA MINERALS COMPANY; DNRC - MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION; DSL - MONTANA DEPARTMENT OF STATE LANDS; EPA - ENVIRONMENTAL PROTECTION AGENCY; MBMG - MONTANA BUREAU OF MINES AND GEOLOGY; MDHES - MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES; MP&T - MONTANA POLE AND TREATMENT; S&A - STILLER AND ASSOCIATES, INC.

ATTACHMENT II-B
SILVER BOW CREEK SURVEY DATA

SILVER BOW CREEK CERCLA RI SURVEY DATA

LOCATION	DATE SURVEYED	POINT ELEVATION	MEASURING POINT DESCRIPTION	MEASURING DATUM USED
Rocker Wells				
GS-01	04/04/85	5360.41	Floor of recorder housing	NGS T 314
GS-02	04/04/85	5360.59	Floor of recorder housing	NGS T 314
Staff Gage	04/04/85	5359.13	Top of staff at 2.00 feet	NGS T 314
DW-204	04/04/85	5372.14	Top of casing	NGS T 314
DW-205	04/04/85	5378.64	Top of casing	NGS T 314
Silver Bow Wells				
GS-03	04/04/85	5325.71	Floor of recorder housing	NGS R 314
GS-04	04/04/85	5325.70	Floor of recorder housing	NGS R 314
Staff Gage	04/04/85	5317.53	Top of staff at 3.00 feet	NGS R 314
Miles Crossing Wells				
GS-05	04/05/85	5271.34	Top of steel protector	USGS 512
GS-06	04/05/85	5271.42	Top of steel protector	USGS 512
Staff Gage	04/05/85	5266.73	Staff at 5.00 feet	USGS 512
DW-227	04/05/85	5305.13	Top of steel casing	USGS 512
DW-229	04/05/85	5275.69	Top of steel casing	USGS 512
Ramsay Flats Wells				
TS-01	04/04/85	5297.65	Floor of recorder housing	NGS Q 314
TS-02	04/04/85	5297.43	Floor of recorder housing	NGS Q 314
TS-03	04/04/85	5297.43	Floor of recorder housing	NGS Q 314
TS-04	04/04/85	5297.19	Top of PVC	NGS Q 314
TS-05	04/04/85	5297.64	Top of steel protector	NGS Q 314
TS-06	04/04/85	5297.47	Top of steel protector	NGS Q 314
TS-07	04/04/85	5297.84	Top of steel protector	NGS Q 314
TS-12	04/04/85	5296.60	Top of steel protector	NGS Q 314
TS-13	04/04/85	5294.43	Top of PVC	NGS Q 314
Butte Wells				
DW-102	04/03/85	5493.36	Top of steel	USGS 5440
DW-105	04/03/85	5480.10	Top of steel	USGS 5440
DW-107	04/03/85	5475.77	Top of steel	USGS 5440
DW-108*	01/16/86	5466	Wooden platform	USGS 5440
DW-109	04/03/86	5465.11	Wooden platform	USGS 5440
DW-110	04/03/85	5458.01	Wooden platform	USGS 5440
DW-111	04/03/85	5457.96	Wooden platform	USGS 5440
DW-112	04/03/85	5456.34	Wooden platform	USGS 5440

* Surveyed to top of steel barrel, difference to wooden platform estimated.

SILVER BOW CREEK CERCLA RI SURVEY DATA
(continued)

LOCATION	DATE SURVEYED	POINT ELEVATION	MEASURING POINT DESCRIPTION	MEASURING DATUM USED
DW-113	04/03/85	5451.02	Wooden platform	USGS 5440
DW-114	04/03/85	5447.99	Wooden platform	USGS 5440
DW-115	04/03/85	5459.66	Wooden platform	USGS 5440
DW-116	04/03/85	5448.29	Top of steel	USGS 5440
DW-117*	01/16/86	5446	Wooden platform	USGS 5440
DW-118	04/03/85	5452.06	Top of steel	USGS 5440
DW-119*	04/03/85	5453	Wooden platform	USGS 5440
DW-120	04/03/85	5454.87	Top of steel	USGS 5440
DW-121	04/03/85	5443.05	Top of steel	USGS 5440
DW-124F	01/16/86	5438.87	Top of steel	USGS 5440
DW-127	04/03/85	5418.94	Top of PVC	NGS W 314
DW-130	01/16/86	5435.12	Top of PVC	USGS 5440
DW-131	01/16/86	5447.86	Top of cap	USGS 5440
DW-132	01/16/86	5431.98	Top of concrete	USGS 5440
DW-133	01/16/86	5438.87	Top of PVC	USGS 5440
DW-134	01/16/86	5440.53	Top of PVC	USGS 5440
DW-135	01/16/86	5436.78	Top of PVC	USGS 5440
DW-136	01/16/86	5434.95	Top of PVC	USGS 5440
DW-137	01/16/86	5433.49	Top of PVC	USGS 5440
DW-138	01/16/86	5435.55	Top of steel	USGS 5440
GS-07	01/16/85	5479.89	Top of steel protector	USGS 5440
GS-08	01/16/86	5458.02	Top of steel protector	USGS 5440
GS-09	01/16/86	5457.78	Top of steel protector	USGS 5440
GS-10	01/16/86	5477.94	Top of steel protector	USGS 5440
GS-11	01/16/86	5457.55	Top of steel protector	USGS 5440
GS-12	01/16/86	5442.74	Top of steel protector	USGS 5440
GS-13A	01/16/86	5441.15	Top of steel protector	USGS 5440
GS-13B	01/16/86	5440.64	Top of steel protector	USGS 5440
GS-14	01/16/86	5455.23	Top of steel protector	USGS 5440
GS-15	01/16/86	5445.28	Top of steel protector	USGS 5440
Warm Springs Wells				
WSP-1	01/17/86	4888.66	Top of steel	USGS 4880
WSP-2	01/17/86	4802.31	Top of steel Control Point 7,	Horizons Map
WSP-3	01/17/86	4801.93	Top of steel Control Point 7,	Horizons Map
WSP-4	01/17/86	4793.51	Top of steel Control Point 7,	Horizons Map
WSP-5	01/17/86	4793.52	Top of steel Control Point 7,	Horizons Map
DW-412	01/17/86	4868.73	Top of steel	NGS C 314
DW-414	01/17/76	4850.66	Top of steel	NGS B 314

* Surveyed to top of steel barrel, difference to wooden platform estimated.

SILVER BOW CREEK CERCLA RI SURVEY DATA
(continued)

LOCATION	DATE SURVEYED	POINT ELEVATION	MEASURING POINT DESCRIPTION	MEASURING DATUM USED
		Ramsay Flats Neutron Probes		
NP-09	05/20/85	5295.4	Ground surface	NGS Q 314
NP-10	05/20/85	5295.8	Ground surface	NGS Q 314
NP-11	05/20/85	5295.4	Ground surface	NGS Q 314
NP-12	05/20/85	5294.9	Ground surface	NGS Q 314
NP-13	05/20/85	5294.9	Ground surface	NGS Q 314
NP-14	05/20/85	5295.1	Ground surface	NGS Q 314
NP-15	05/20/85	5294.9	Ground surface	NGS Q 314
NP-16	05/20/85	5295.4	Ground surface	NGS Q 314
NP-17	05/20/85	5295.6	Ground surface	NGS Q 314
NP-18	05/20/85	5295.3	Ground surface	NGS Q 314
NP-19	05/20/85	5294.5	Ground surface	NGS Q 314
NP-20	05/20/85	5293.8	Ground surface	NGS Q 314
NP-21	05/20/85	5293.4	Ground surface	NGS Q 314
NP-22	05/20/85	5293.9	Ground surface	NGS Q 314
NP-23	05/20/85	5294.8	Ground surface	NGS Q 314
NP-24	05/20/85	5294.8	Ground surface	NGS Q 314

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ATTACHMENT III

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ATTACHMENT III-A
SILVER BOW CREEK MONITORING WELL LITHOLOGIC LOGS

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-01

Legal Location: T 3N R 8W Sec 17 Tract CDD Descriptive Location: N. bank SBC, approx. 1/2 mi. W. of Rocker

Recorded by: Braun Date Hole Started: 12/27/84 Date Hole Completed: 12/28/84 Driller: Frosty Drilling Company: O'Keefe

Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6" Reamed Hole Diameter: N/A

Total Depth Drilled: 14.6' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 14.6' Diameter and flush threaded Type of Casing: 4" PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: ~~14.5'~~-9.5' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO	Method Perforated or Screened	
Well Developed?		X		No casing in hole.
Well Test Pumped?		X		Open bottom only.
Water Samples Taken?		X		Slotted with Mill's Knife.
Material Samples Taken?	X		5', intervals	Slotted with a torch.
E-Logs?		X		Screened by pulling casing.
				Saw cut.
			X	Other (specify) 0.030" factory slot

Static Water Level: 3.6' Date: 12/28/84

Measuring Point Description/Elevation: Floor of recorder housing; ~~5360'~~ 5360.5 (surveyed) (topo map) MP Height Above (+/-) or Below G.S.: 1.65'

Well Annulus Completion Description: Backfill with cuttings-gravel-bent. pellets from 30' to 16', 1.5' bent. pellets 16'-14.5'; 8-14 mesh inert silica sand 14.5'-6.5'; 2.5' bent. seal to 4'; fill to 1.5'; grout-in recorder housing 1.5' to surface.

Remarks: Weather mostly cloudy-later snow, approx. 20 F; -15 F at night.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2'	Tailings; silt/clay; md.-lt. brown to red brown; gray-green; occ. v.f. sand; froze to 1 1/2'-2'. Material in various stages of oxidation.
2'	2.5'	Peat with clay; v. dark brown, dark gray-black; occ. wood frags.
2.5'	4'	Gravel with sand; med. gray-tan; subang.-ang., clay, silt matrix, poor-mod. sorting, scat. wood frags.
4'	8'	Gravel and m.c. sand; lt.-med. gray-pink, ang.-occ. sub rounded, f-spar. (20% of sample), qtz. (50% of sample), granite (10% of sample), RF; o.k. gray volc. frags. (10% of sample), 5-6 gpm, water, sand range: f.-v.c.; occ. well sorted.

From	To	Geological, Drilling, and Water Conditions and Sampling
8'	15'	Sand and occ. f. gravel; lt.-med. gray-pink, ang.-subang.; qtz. (60% of sample) RF (20% of sample), f-spar. (20% of sample), mod. sorting heavy in bottom part.
15'	19'	Clay with sand and gravel; lt. brown to red orange; silty and sandy with occ. grav., ang.
19'	30'	Clay; lt. brown, red-orange; occ. sandy and silty.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-02

Legal Location: T 3N R 8W Sec 17 Tract CDD Descriptive Location: N. bank SBC, approx. 1/2 mi. W. of Rocker (8' e. of GS-01)

Recorded by: Braun Date Hole Started: 12/28/84 Date Hole Completed: 12/28/84 Driller: Frosty Drilling Company: O'Keefe

Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6" Reamed Hole Diameter: N/A

Total Depth Drilled: 6.2' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 6.2' Diameter and flush threaded Type of Casing: 4" PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 6'-1' Target Aquifer: Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?	____	X
Well Test Pumped?	____	X
Water Samples Taken?	____	X
Material Samples Taken?	____	X
E-Logs?	____	X

Method Perforated or Screened

____ No casing in hole.
____ Open bottom only.
____ Slotted with Mill's Knife.
____ Slotted with a torch.
____ Screened by pulling casing.
____ Saw cut.
X Other (specify) 0.030" factory slot

Static Water Level: 4.3' Date: 12/28/84

Measuring Point Description/Elevation: Floor of recorder housing; ~~5360'~~ 5360.6' (surveyed) ~~(tape-map)~~ MP Height Above (+/-) or Below G.S.: 2.8'

Well Annulus Completion Description: 8-14 mesh inert silica sand 6.2'-1'; grout-in recorder housing 1' to surface.

Remarks: _____

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1.8'	Tailings; fine sand to clay size material; lt. brown, rd. brown, gray-green.
1.8'	2.5'	Peat with clay; v. dk. brown, dk. gray-black; wood frags.
2.5'	4'	Gravel with sand; med. gray-tan; subang.-ang., clayey silt matrix, pr. srting.; occ. wood.
4'	6.2'	Gravel and med. c. sand; lt.-med. gray-pink, ang.-subang., qtz. (60% of sample), RF (20% of sample), f-spar. (70% of sample), fair srting., heaving sand, approx. 3 gpm water.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-03

Legal Location: T 3N R 9W Sec 13 Tract DCB Descriptive Location: N. bank SBC, Ueland's property

Recorded by: Grotbo, Brain Date Hole Started: 12/18/84 Date Hole Completed: 12/26/84 Driller: Frosty Drilling Company: O'Keefe

Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6" Reamed Hole Diameter: N/A

Total Depth Drilled: 23' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 23' Diameter and/flush threaded Type of Casing: 4" PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: -23'+13' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO	
Well Developed?	____	X	
Well Test Pumped?	____	X	
Water Samples Taken?	____	X	
Material Samples Taken?	X	____	5'' intervals
E-Logs?	____	X	

Method Perforated or Screened

____ No casing in hole.
____ Open bottom only.
____ Slotted with Mill's Knife.
____ Slotted with a torch.
____ Screened by pulling casing.
____ Saw cut.
X Other (specify) 0.030' factory slot

Static Water Level: 6.17' Date: 12/26/84

Measuring Point Description/Elevation: Floor of recorder housing; ~~5330'~~ ~~(topo map)~~ 5325.7' (surveyed) MP Height Above (+/-) or Below G.S.: 1.2'

Well Annulus Completion Description: 8-14 mesh inert silica sand 11'-23'; .25' bent. pellets 8'-11'; cuttings 3.5'-8'; premix concrete plug 1.5'-3.5'; recorder housing pipe set in concrete 1.5'-0'.

Remarks: _____

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	8'	Tailings; silt, clayey; dk. brown to med. gray; occ. v.f. sand and small gravel - plastic.
8'	12'	Gravel-sand; white to dark, med. to coarse sand, small gravel; subang.-ang., poorly sorted, silt matrix-mineralogy primarily qtz., f-spar., slightly oxidized, little water at 8'.
12'	13'	Gravel; dk. to lt., small to med; subang.-subrounded, gray silt matrix; wood frags. scattered.
13'	17.5'	Gravel; vari-colored, well sorted, subang.-subrned., spherical, dk. gray volcanics (approx. 40% of sample), qtz. (60% of sample), f-spar. (Making water > 7gpm at 13-15', fine to med sand matrix.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-04
Legal Location: T 3N R 9W Sec 13 Tract DCB Descriptive Location: N. bank SBC, Ueland's property
Recorded by: Braun Date Hole Started: 12/26/84 Date Hole Completed: 12/26/84 Driller: Frosty Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6" Reamed Hole Diameter: N/A
Total Depth Drilled: 8' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8' Diameter and Type of Casing: 4" PVC flush threaded
Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: ~~8'-3'~~ Target Aquifer: Surface Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?	___	X
Well Test Pumped?	___	X
Water Samples Taken?	___	X
Material Samples Taken?	X	___ 5' intervals
E-Logs?	___	X

Method Perforated or Screened

___	No casing in hole.
___	Open bottom only.
___	Slotted with Mill's Knife.
___	Slotted with a torch.
___	Screened by pulling casing.
___	Saw cut.
X	Other (specify) 0.030" factory slot

Static Water Level: 8.42' Date: 12/26/84
Measuring Point Description/Elevation: Floor of recorder housing; ~~5330'~~ 5325.7' (surveyed) ~~(topo map)~~ MP Height Above (+/-) or Below G.S.: 1.3'
Well Annulus Completion Description: 8-14 mesh inert silica sand 8'-3'; .25' bent. pellets 3'-2'; grout-in recorder housing 2' to surface.

Remarks: _____

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	8'	Tailings; silt, clayey, dk. brown, red, gray, with occ. v.f.-f. sand. Seep of water.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-05

Legal Location: T 3N R 9W Sec 16 Tract BCD Descriptive Location: Miles Crossing, Konda Ranch; approx 75' N of SS-14

Recorded by: Braun Date Hole Started: 03/15/85 Date Hole Completed: 1000 hrs 03/15/85 1410 hrs. Driller: Jim Orr Drilling Company: O'Keefe

Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6 5/8" Reamed Hole Diameter: N/A

Total Depth Drilled: 35' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 30' Diameter and Type of Casing: flush threaded 4" PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: ~~-29'~~ -19' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?	____	x
Well Test Pumped?	____	x
Water Samples Taken?	____	x
Material Samples Taken?	x	____
E-Logs?	____	x

5' intervals

Method Perforated or Screened

____	No casing in hole.
____	Open bottom only.
____	Slotted with Mill's Knife.
____	Slotted with a torch.
____	Screened by pulling casing.
____	Saw cut.
x	Other (specify) 0.030" factory slot

Static Water Level: 8.3' Date: 03/15/85

Measuring Point Description/Elevation: Top of Well Protector ~~5270'~~ 5271.3' (surveyed) (topo map)

MP Height Above (+/-) or Below G.S.: 1.9'

Well Annulus Completion Description: 8 to 14 mesh inert silica sand 29'-13'; .25' bent. pellets; backfilled 12.75'-2'; .25' bent. pellets; grout-in well protector 1.75'-surface.

Remarks: _____

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2'	Soil; dk. brown; silty clay some saline crust on surface.
2'	6'	Silty clay; med. dk. brown, sticky, good ribbon.
6'	11'	Silty clay with lenses of f. gravel/ v.c. sand (approx 30% of sample) vfr, qtz, f-spar, ang.-sbrnded, poor-fair sorting, wood frags, hole stays open.
11'	21'	A/A with increase in sand/gravel (approx. 60% of sample); seep of water at 12'-16', some gray-green clay approx. 2 gpm.
21'	26'	Claystone/silty clay; green and lt. red brown, grdg. v.f.-f. sand l.p. fair sorting; poor-moderate porosity, several gpm water; swl approx. 6' from G.S.
26'	30'	A/A with interbedded c. sand.
30'	35'	Clay; rust, red-brown, sticky, good ribbon.

Backfilled with Cuttings and bent. 35'-32', Sand 32'-30.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-06

Legal Location: T 3N R 9W Sec 16 Tract BDC Descriptive Location: Miles Crossing, Konda Ranch; approx. 150' E. of GS-05

Recorded by: Braun Date Hole Started: 03/15/85 Completed: 1510 hrs. Date Hole 03/15/85 Completed: 1815 hrs.

Drill Method: Cable Tool Driller: Jim Orr Drilling Company: O'Keefe

Total Depth Drilled: 31' Drilling Fluids Used: Water Pilot Hole Diameter: 6 5/8" Reamed Hole Diameter: N/A

Total Depth Reamed: N/A Total Depth Cased Below G.S.: 30' Diameter and flush threaded Type of Casing: 4" PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 29'-19' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?	____	X
Well Test Pumped?	____	X
Water Samples Taken?	____	X
Material Samples Taken?	X	____ 5' intervals
E-Logs?	____	X

Method Perforated or Screened

____ No casing in hole.
____ Open bottom only.
____ Slotted with Mill's Knife.
____ Slotted with a torch.
____ Screened by pulling casing.
____ Saw cut.
X Other (specify) 0.030" factory slot

Static Water Level: 8.2' Date: 03/15/85

Measuring Point Description/Elevation: Top of Well Casing, ~~5272'~~ (topo map) 5271.4' (surveyed)

MP Height Above (+/-) or Below G.S.: 1.9'

Well Annulus Completion Description: 8-14 mesh inert silica sand 1.5' to 25' bent on bottom; 29-1.5' CONCRETE GROUT

Remarks: STEEL WELL PROTECTOR.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2'	Soil clayey silt; saline precipitate on surface.
2'	7'	Silty clay; med. dk. brown, sticky, ribbon.
7'	12.5'	A/A with lense of v. coarse sand and gravel (<1" diameter) (approx. 60% of sample), qtz., f-spar., VRF, IRF, ang.-subrounded, poor-fair sorting; mod.-good porosity.
12.5'	20'	A/A sand and gravel (approx 80% of sample), 2 gpm water.
20'	30'	Silty clay with lense of sand and gravel (<1/2" diameter) (80% of sample), poor-good sorting in lenses, qtz., f-spar., VRF, 10-12 gpm water.
30'	31'	Clay; rust, red brown, soft ribbon.

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Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-07

Legal Location: T 3N R 7W Sec 19 Tract AAC Descriptive Location: SE corner of city-county shop complex

Recorded by: Braun Date Hole Started: 11/21/85 Date Hole Completed: 11/26/85 Drilling Driller: Mike O'Keefe Drilling Company: O'Keefe

Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 5.5" Tool Reamed Hole Diameter: 7.5" Drive Shoe

Total Depth Drilled: 180' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 160 Diameter and Type of Casing: 4" Threaded PVC

Weight or Gage of Casing: SCH 40 Interval Perforated or Screened Below G.S.: 130'-160' Target Aquifer: SBC Qal Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?	____	X
Well Test Pumped?	____	X
Water Samples Taken?	____	X
Material Samples Taken?	X	____
E-Logs?	____	X

Method Perforated or Screened

____	No casing in hole.
____	Open bottom only.
____	Slotted with Mill's Knife.
____	Slotted with a torch.
____	Screened by pulling casing.
____	Saw cut.
X	Other (specify) 0.030" factory slot

Static Water Level: 21.3 Date: 11/22/85

Measuring Point Description/Elevation: Top of steel well protector/5479.89 (surveyed) MP Height Above (+/-) or Below G.S.: 1.9'

Well Annulus Completion Description: Colorado Silica Sand (8-12) mesh 160'-120'; bentonite plug 120'-115'; Pioneer Concrete, Inc. pea gravel 115'-3'; bentonite plug 3'-2'; concrete grout steel well protector with lock.

Remarks: ____

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1'	Soil; buff to lt. gray; poorly developed, slag and waste rock parent material; silty-sand texture.
1'	8'	Fill material; lt. brown and gray to black; clasts up to 20", poorly sorted and angular; fragments of slag, Q-monzonite, trachyte, volcanic rock fragments; clay matrix; poor porosity; dry hole, 5 gal H20 added @ 8'.
8'	19'	Gravel fill; lt. brown and gray to black; clasts up to 4" diam., generally finer than above; poorly sorted; subangular; same lithology as above; 5 gal. H20 added at 13' and 18'; split spoon sample @18'-20'.

19'	26'	Tailings; medium brown-gray to dark gray and stained orange and occasional dark green clayey matrix around sand; clasts up to 2" diam. rare; occasional sand lens is well sorted; subangular; Qtz, Mica, F-spar, mafics; 5 gal. H20 added @ 23'; poor porosity; split spoon sample 24'-26'.
26'	41'	Sand and gravel; sand (80%), gravel (20%); buff to medium brown and gray; clasts up to 1.5"; subangular; fair sorting; lithology as above; fair porosity; seep of H20 @ 26', 1 gpm @ 30; split spoon sample 30'-32'; heaving sand @ 35'.
41'	48'	Sand and clay; clay (40%), sand (60%), alternating beds; clay: dark brown with occasional thin zones of orange oxidation,beds of clay are 4"-8" thick; very poor porosity; sand: buff to tan; medium-coarse grained; subrounded to subangular; matrix is silty clay; fair porosity sand beds 1"-2" thick; split spoon sample 45'-47'.
48'	60'	Sand and gravel; sand (80%), gravel (20%); gravel clasts up to 1" diam.; angular-subangular; lithology same as sand above with igneous rock fragment predominate; bailer sample at 60'-50'.
60'	72'	Sand and gravel; sand (95%), gravel (5%); lithology as above; 8-10 gpm at 63; yield reduced to 3 gpm at 66'.
72'	80'	Silty clay and sand; sand (70%), silty clay (30%), interbedded; clay: red-orange with some oxidation; yield reduced to 0.5 -1.0 gpm.
80'	85'	Sand; sand (95%) and gravel (5%); lithology as above; clasts up to 3/4" diam.; yield=30gpm.
85'	95'	Sand (100%); lithology as above; good porosity; yield > 30 gpm; hole stays open 8-10' below casing; bailer sampled at 90'; SWL after 1 hour recovery time = 46'.
96'	106'	Silty sandy clay; clay (50%), silt (30%), sand (20%); clay and silt: red-brown; sticky; poorly sorted; yield reduced to 10 gpm.
106'	109'	Sandy gravel; sand (50%),gravel (50%); tan to gray; clasts up to 3/4"; angular; fair sorting; good porosity; as above, yield 20 gpm.
109'	113'	Sand (100%); as above; alternating beds of fine to coarse grained; yield 15 gpm.
113'	118'	Silty clayey sand; sand (70%) silty clay (30%); yield approximately 5gpm.
118'	125'	Sand (100%); lithology as above; alternating beds of fine to coarse grained; some silty beds; yield 20-30 gpm.
125'	140'	Silty clayey sand; sand (70%), silty clay (30%); alternating beds as above.
140'	165'	Sand (100%); lithology as above; yield >30 gpm; heaves at 165'.
165'	180'	Sand (100%); varicolored; medium grained; poorly sorted; subangular to subrounded; silt matrix; size ranges from fine to coarse.

Parameters measured during drilling

Depth	S.C.	Temp. (°C)	pH
35'	1600		5.8
45'	1500	7	5.8
83'	2040	10.5	5.8
91'	2240		
100'	2570		5.3
140'	1960	10	6.1
150'	1660	10	6.1
165'	1820		
172'	1600	10.5	5.6

* S.C. not adjusted for temperature and cell factor.

Miller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-08

Legal Location: T 3N R 7W Sec 19 Tract CBAD Descriptive Location: 75' S. of George St. 200' S. of MSD on Butte City Property

Recorded by: Dunlavy Date Hole Started: 11/22/85 Date Hole Completed: 11/25/85 Driller: Frosty Drilling Company: O'Keefe

Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 5.5" Reamed Hole Diameter: 7.5" Drive Shoe

Total Depth Drilled: 151' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 145.5' Diameter and Type of Casing: 4" Flush Threaded PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 127.5'-145.5' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) 0.030" factory slot

Static Water Level: 12.44 Date: 11/26/85 @ 1200 hrs.

Measuring Point Description/Elevation: Top of steel well protector/5458.02 (surveyed)

MP Height Above (+/-) or Below G.S.: 1.5

Well Annulus Completion Description: Colorado Silica Sand (8-12) mesh 151'-116'; 1/4" Volclay bentonite pellets 116'-108'; Pioneer Concrete, Inc. pea gravel 108'-3'; bentonite) plug 3'-2' ; concrete grout steel well protector with ca

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	.5'	Top soil; occassional sand and gravel (<20%); black; silty loam; organics.
.5'	6'	Organic soil; silt (50%), sand (50%); dark brown; occasional iron stained gravels up to 1.5" (<5%); chips of glass, wood and coal; fill material.
6'	15'	Organic fill material; occasional sands (<5%) mostly clayey silts (90%); chips of glass, wood, and nails; less glass and wood @11'; swamp material; very tight; possible seep @13'.
15'	30'	Sand; interbedded sand and fine grained silts; sand (75%), silts (25%); mottled; coarse grained; subangular to angular granitic sand; highly permeable beds of sand interbedded with tight beds of clayey silt; sand lenses 1-1.5' thick, clay lenses .5' thick; bails less than 1 GPM; core sample @15' contains possible tail material; increasing water yeild @ 25'; few gravels, probably less fine grained material.

30'	36'	Gravel and sand; gravel (90%), sand (10%); very little clay; coarse; subangular clasts up to 1.5"; composition as above; very permeable, 35-40 gpm (bailing).
36'	37'	Gravel, sand, and clay; clay (60%), sand and gravel (40%); orange to buff colored; composition as above; fairly tight, <5gpm, some heaving.
37'	42'	Sand and gravel; sand (50%) with sub-angular gravels to 1"; composition as above; less clay, silty; permeable, makes about 20 GPM.
42'	79'	Sand and gravel with interbedded clays; fairly tight; composition as above; core sample @42', retrieved large 1.5" quartz clast; <2 gpm estimated; less clay @68'.
79'	80'	Sand and gravel; more gravel than above, gravel (30%), sand (30%), silt and clay (40%); fine to coarse subrounded sand; composition as above; makes alot of water, 50 gpm est.
80'	97'	Sand; silty clayey sand, sand (70%), clay and silt (30%), occasional gravels; medium to coarse subrounded sand; composition as above; permeable; very coarse, clean sand at 85', heaving, few gravels.
97'	100'	Clay; sandy clay, clay (70%), sand (30%); dark brown to orange; able to drill open hole.
100'	110'	Sand; clayey sand, sand (70%), clay (30%); sand is medium grained, poorly sorted; composition as above; not much water, less than 5 gpm.
110'	134'	Sand and clay; sand (40%), clay (40%), gravel (20%); mottled orange-white to dark brown to purple; coarse sand and gravel interbedded with fairly cohesive clay; core sample @ 116'; makes alot of water.
134'	135'	Clay; sandy clay, clay (80%), sand (20%); tight.
135'	148'	Sand and clay; sand (40%), clay (40%), gravel (20%), makes alot of water.
148'	151'	Clay; sandy clay, clay (80%), sand (20%); orange to dark brown; subangular to subrounded sand, sticky clay; tight.

Field Parameters Measured While Drilling

Depth	S.C.*	pH
15'	1100	6.7
30'	1140	6.0
37'	1400	6.0
68'	2340	5.8
80'	2140	6.2
100'	2120	5.6
116'	1210	6.0
135'	1160	6.8
145'	920	6.1

* S.C. is adjusted

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-09
Legal Descriptive
Location: T 3N R 7W Sec 19 Tract CBAD Location: 10' SE. of GS-08
Date Hole 1200 hrs. Date Hole 1600 hrs.
Recorded by: Dunlavy Started: 11/26/85 Completed: 11/27/85 Driller: Frosty Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 5.5" Tool Reamed Hole Diameter: 7.5" Drive Shoe
Total Depth Drilled: 75.5' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 75.5' Diameter and Type of Casing: 4" Flush Threaded PVC
Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 60.5'-75.5' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		X
Well Test Pumped?		X
Water Samples Taken?		X
Material Samples Taken?	X	
E-Logs?		X

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
X	Other (specify) 0.030" factory slot

Static Water Level: 10.85' Date: 11/27/85 @ 1600 hrs.
Measuring Point Description/Elevation: Top of steel well protector/5457.78 (surveyed) MP Height Above (+/-) or Below G.S.: +1.0'
Well Annulus Completion Description: Colorado Silica Sand (8-12) mesh 75.7'-58.5'; Volclay bentonite pellets 58.5'-54.5'; Pioneer Concrete, Inc. pea gravel 54.5'-3'; bentonite plug 3'-2'; concrete grout steel well protector with lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	.5'	Top soil; occassional sand and gravel (<20%); black; silty loam; organics.
.5'	6'	Organic soil; silt (50%), sand (50%); dark brown; occasional iron stained gravels up to 1.5" (<5%); chips of glass, wood and coal; fill material.
6'	15'	Organic fill material; occasional sands (<5%) mostly clayey silts (90%); chips of glass, wood, and nails; less glass and wood @11'; swamp material; very tight; possible seep @13'.

15'	30'	Sand; interbedded sand and fine grained silts; sand (75%), silts (25%); mottled; coarse grained; subangular to angular granitic sand; highly permeable beds of sand interbedded with tight beds of clayey silt; sand lenses 1-1.5' thick, clay lenses .5' thick; bails less than 1 GPM; core sample @15' contains possible tail material; increasing water yeild @ 25'; few gravels, probably less fine grained material.
30'	36'	Gravel and sand; gravel (90%), sand (10%); very little clay; coarse; subangular clasts up to 1.5"; composition as above; very permeable, 35-40 gpm (bailing).
36'	37'	Gravel, sand, and clay; clay (60%), sand and gravel (40%); orange to buff colored; composition as above; fairly tight, <5gpm, some heaving.
37'	42'	Sand and gravel; sand 50% with sub-angular gravels to 1"; composition as above; less clay, silty; permeable, makes about 20 GPM.
42'	75'	Sand and gravel with interbedded clays; fairly tight; composition as above; core sample @42', retrieved large 1.5" quartz clast; <2 gpm estimated; less clay @ 68.0'.

Field Parameters Measured While Drilling

Depth	S.C. (adjusted)
28'	1130
40'	1600
45'	1690
55'	1520
60'	2470

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-10 A(D) and B(SH)
Legal Location: T 3N R 7W Sec 19 Tract AAC Descriptive Location: 10-15' W. of GS-07
Recorded by: Grotbo Date Hole Started: 11/26/85 Date Hole Completed: 12/04/85 Drilling Driller: Mike O'Keefe Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Butte City ater Pilot Hole Diameter: 5.5" Tool diameter Reamed Hole Diameter: 7.5" Drive Shoe
Total Depth Drilled: 112' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 110' Diameter and Type of Casing: 2" Flush Threaded PVC - dual completion
Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 100'-110' A 19'-29' B Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?	____	X
Well Test Pumped?	____	X
Water Samples Taken?	____	X
Material Samples Taken?	X	____
E-Logs?	____	X

Method Perforated or Screened

____	No casing in hole.
____	Open bottom only.
____	Slotted with Mill's Knife.
____	Slotted with a torch.
____	Screened by pulling casing.
____	Saw cut.
X	Other (specify) 0.01" factory slot

Static Water Level: 20.3' A and 19.9' B Date: 12/18/85
Measuring Point Description/Elevation: Top of steel well protector/5477.94 (surveyed) MP Height Above (+/-) or Below G.S.: +.8
Well Annulus Completion Description: Dual completion; Colorado Silica Sand (20-40) mesh 110'-90'; Volclay bentonite pellets 90'-88'; Butte Silver Bow grus sand 88'-34'; bentonite pellets 34'-30'; Colorado Silica Sand (20-40) 30'-10'; bentonite pellets 10'-7'; Butte SBC grus sand 7'-4'; bentonite 4'-2'; concrete grout steel well protector with lock.

Remarks: ____

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1'	Soil; buff to lt. gray; poorly developed, slag and waste rock parent material; silty-sand texture.
1'	8'	Fill material; lt. brown and gray to black; clasts up to 20", poorly sorted and angular; fragments of slag, Q-monzonite, trachyte, volcanic rock fragments; clay matrix; poor porosity; dry hole.
8'	19'	Gravel fill; lt. brown and gray to black; clasts up to 4" diam., generally finer than above; poorly sorted; subangular; same lithology as above.

19'	26'	Tailings; medium brown-gray to dark gray and stained orange and occasional dark green; clayey matrix around sand; clasts up to 2" diam. rare; occasional sand lens is well sorted; subangular; Qtz, Mica, F-spar, mafics; 5 gal. H20 added @ 23'; poor porosity.
26'	41'	Sand and gravel; sand (80%), gravel (20%); buff to medium brown and gray; clasts up to 1.5"; subangular; fair sorting; lithology as above; fair porosity; seep of H20 @ 26', 2 gpm @ 30; heaving sand @ 35'.
41'	48'	Sand and clay; clay (40%), sand (60%), alternating beds; clay: dark brown with occasional thin zones of orange oxidation beds of clay are 4"-8" thick; very poor porosity; sand: buff to tan; medium-coarse grained; subrounded to subangular; matrix is silty clay; fair porosity sand beds 1"-2" thick.
48'	60'	Sand and gravel; sand (80%), gravel (20%); gravel clasts up to 1" diam.; angular-subangular; lithology same as sand above with igneous rock fragment predominate.
60'	72'	Sand and gravel; sand (95%), gravel (5%); lithology as above; 8-10 gpm at 63; yield reduced to 3 gpm at 66'.
72'	80'	Silty clay and sand; sand (70%), silty clay (30%), interbedded; clay: red-orange with some oxidation; yield reduced to 0.5 -1.0 gpm.
80'	85'	Sand; sand (95%) and gravel (5%); lithology as above; clasts up to 3/4" diam.; yield=30gpm.
85'	95'	Sand (100%); lithology as above; good porosity; yield > 30 gpm; hole stays open 8-10" below casing; bailer sampled at 90'.
96'	106'	Silty sandy clay; clay (50%), silt (30%), sand (20%); clay and silt : red-brown; sticky; poorly sorted; yield reduced to 10 gpm.
106'	109'	Sandy gravel; sand (50%), gravel (50%); tan to gray; clasts up to 3/4"; angular; fair sorting; good porosity; as above, yield 20 gpm.
109'	110'	Sand (100%); as above; alternating beds of fine to coarse grained; yield 15 gpm.

Field Parameters Measured While Drilling

Depth	S.C. (adjusted)	Temp. (C)	pH
33'	1100	8.5	5.4
37'	1950	7	5.3
47'	1300	5	5.7
50'	1370	10	5.7
59'	2010	17	5.6
62'	1450		5.7
75'	2500	9	5.7
80'	3200	9	5.6
90'	3300	10	5.5
100'	3140	8	6.1
105'	3600	8	5.9

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-11
Legal Descriptive
Location: T 3N R 7W Sec 19 Tract CBAD Location: 10' W. of GS-09
Date Hole Drilling: 0945 hrs. Date Hole Completed: 1300 hrs.
Recorded by: Dunlavy Started: 12/03/85 Completed: 12/03/85 Driller: Frosty Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Butte City Water Pilot Hole Diameter: 5.5" Tool Reamed Hole Diameter: 7.5" drive shoe
Total Depth Drilled: 18' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 18' Diameter and Type of Casing: 2" Flush Threaded PVC
Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 08'-18' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) 0.01" factory slot

Static Water Level: 11.04' Date: 12/03/85 @ 1600 hrs.
Measuring Point Description/Elevation: Top of steel well protector/5457.55 (assumed) MP Height Above (+/-) or Below G.S.: + 1.12'
Well Annulus Completion Description: Colorado Silica Sand (20-40) mesh 18'-7'; Volclay bentonite pellets 7'-5'; Pioneer Concrete, Inc. pea gravel 5'-3'; bentonite 3'-2'; concrete grout steel well protector with lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	.5'	Top soil; occassional sand and gravel (<20%); black; silty loam; organics.
.5'	6'	Organic soil; silt (50%), sand (50%); dark brown; occasional iron stained gravels up to 1.5" (<5%); chips of glass, wood and coal; fill material.
6'	15'	Organic fill material; occasional sands (<5%) mostly clayey silts (90%); chips of glass, wood, and nails; less glass and wood @11'; swamp material; very tight; possible seep @13'.
15'	18'	Sand; interbedded sand and fine grained silts; sand (75%), silts (25%); mottled; coarse grained; subangular to angular granitic sand; highly permeable beds of sand interbedded with tight beds of clayey silt; sand lenses 1-1.5' thick, clay lenses .5' thick; bails less than 1 GPM; contains possible tail material.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-12

Legal Location: T 3N R 8W Sec 24 Tract CBD Descriptive Location: Near Missoula Gulch, 500' S. of Centennial Avenue

Recorded by: Dunlavy Date Hole Started: 12/04/85 Date Hole Completed: 12/04/85 Driller: Frosty Drilling Company: O'Keefe

Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 5.5" Tool diameter Reamed Hole Diameter: 7.5" drive shoe

Total Depth Drilled: 29.5' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 29.5' Diameter and Type of Casing: 2" Flush Threaded PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 19.5'-29.5' Target Aquifer: Miss. Gulch Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) 0.01" factory slot

Static Water Level: 9.55' Date: 12/11/85 @ 1600 hrs.

Measuring Point Description/Elevation: Top of steel well protector/5422.74 (survey) MP Height Above (+/-) or Below G.S.: + 1.50'

Well Annulus Completion Description: Colorado Silica Sand (20-40) mesh 29.5'-15'; Volclay bentonite pellets 15'-5'; Pioneer Concrete, Inc. pea gravel 12.5'-3'. Bentonite plug 3'-2'; concrete grout steel well protector with lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0	13'	Silt; silt (90%), sand (10%), occasional gravel; brown silts; increasing small- 1/4" gravels with depth; few if any organics.
13'	26'	Sand and silt; sand (50%), silt (50%); interbedded sand and silt in beds .5'-1'; sand is medium grained; moderately sorted; subrounded; few silts; composition: 50% quartz, 25% feldspar, 25% mafics; silts are dark brown to black; finely laminated; mica present; occasional clayey layer; making 2 gpm @ 15'; Missoula Gulch alluvium; core sample @ 18'.
26'	27'	Sand; sand (80%); fine-medium sand; poorly sorted; alot of mafics, micas; clean, very little silt; making 2 gpm @ 26'.
27'	29'	Sand and gravel; clean sand (50%), gravel (50%); composition as above; subrounded to subangular sand and gravel; gravel up to 3/8"; makes alot of H_2O, >25 gpm.
29'	29.5'	Bedrock; quartz monzonite; very hard drilling, can't drive casing.

Field Parameters Measured While Drilling

Depth	S.C. (adjusted)	pH
18'	540	6.4
25'	460	6.5
26'	530	6.5
27'	520	

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-13A
Legal Descriptive
Location: T 3N R 8W Sec 24 Tract CBA Location: 100' N. of SBC, 500 yards E. of GS-12
Date Hole 1000 hrs. Date Hole Drilling
Recorded by: Dunlavy Started: 12/05/85 Completed: 12/13/85 Driller: Mike O'Keefe Company: O'Keefe
Drill Drilling Pilot Hole Reamed Hole
Method: Cable Tool Fluids Used: Water Diameter: 5.5" Tool diameter Diameter: 7.5" drive shoe
Total Depth Total Depth Total Depth Diameter and
Drilled: 30.5' Reamed: N/A Cased Below G.S.: 17.5 Type of Casing: 4" flush threaded PVC
Weight or Interval Perforated Target Packer Type and
Gage of Casing: .250" Steel or Screened Below G.S.: 12.5'-17.5' Aquifer: SBC Alluvium Depth Below G.S.: N.

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) 0.03" factory slot

Static Water Level: 6.20 Date: 12/18/85
Measuring Point Description/Elevation: Top of steel well protector/5441.15 (surveyed) MP Height Above (+/-) or Below G.S.: 1.65'
Well Annulus Completion Description: Colorado Silica Sand (8-12) mesh 15.5'-10'; Volclay bentonite pellets 10'-9'; native material and Pioneer Concrete, Inc. pea gravel 9'-3'; bentonite plug 3'-2'; concrete grout steel well protector with lock.

Remarks: Weld broke at 20.5' while pulling steel, left 10' of steel in bore hole from 30.5'-20.5'.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0	3.5'	Silt; dark brown to black clayey silt; micas, pyrite; few sand grains (10%); sticky moist.
3.5'	8.0'	Silt and sand; dark brown to black silt; more sand than above, approximately (20%); sor clay; moist.
8.0'	15'	Silty sand; sand (70-80%); dark brown-black silt matrix; subrounded; fair sorting; quar dominant mineral; traces of clay.
15'	23'	Sand; medium to coarse; poorly sorted; granitic parent material; few silts; blac discolors sample; making 5 gpm @ 20'.

23'	29'	Sand and gravel; coarse; makes alot of H_2O @ 23'; looks like weathered bedrock; steel glanced off something hard @ 24'.
29'	30.5'	Bedrock; quartz monzonite; less H_2O; very hard; can't drive casing.

Field Parameters Measured During Drilling

Depth	S.C. (adjusted)	pH
20'	1490	6.1
23'	1140	6.5

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-13B
Legal Descriptive Location: T 3N R 8W Sec 24 Tract CBA Location: 25' W. of GS-13A
Recorded by: Dunlavy Date Hole Started: 12/06/85 Date Hole Completed: 12/06/85 Driller: Mike O'Keefe Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 5.5" Tool diameter Reamed Hole Diameter: 7 5/8" drive shoe
Total Depth Drilled: 34' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 34' Diameter and Type of Casing: 6" Steel
Weight or Gage of Casing: SCH 40 Interval Perforated or Screened Below G.S.: 24'-28' and 31'-32' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
x	Open bottom.
x	Slotted with Mill's Knife.
x	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
	Other (specify)

Static Water Level: 5.75 Date: 12/19/85
Measuring Point Description/Elevation: Top of steel well protector/5440.64 (surveyed) MP Height Above (+/-) or Below G.S.: +.5
Well Annulus
Completion Description: 34' of 6" steel casing; drive shoe; open bottom; torch cut perforations from 31'- 32'; perforated with mills knife 24'-28'; locking cap.

Remarks: Couldn't pull steel casing, left in hole.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0	3.5'	Silt; dark brown to black clayey silt; micas, pyrite; few sand grains (10%); sticky, moist.
3.5'	8.0'	Silt and sand; dark brown to black silt; more sand than above, approximately (20%); some clay; moist.
8.0'	15'	Silty sand; sand (70-80%); dark brown-black silt matrix; subrounded; fair sorting; quartz dominant mineral; traces of clay.
15'	22'	Sand; medium to coarse; poorly sorted; granitic parent material; few silts; black discolors sample; making 5 gpm @ 20'.
22'	34'	Sand and gravel; coarse; granitic sand and gravels up to 3/8"; gravels are subangular; granitic composition; sand as above; no water at 25', makes water again at 28'.

34' Bedrock; quartz monzonite; very hard; making about 20 gpm.

Field Parameters Measured While Drilling

Depth	S.C. (adjusted)	pH
20'	1510	6.2

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: GS-14

Legal Location: T 3N R 7W Sec 19 Tract CCD

Descriptive Location: Approximately 200 yards S. of GS-08 on Catholic Church prop

Date Hole Drilling Started: 1630 hrs. 12/09/85 Date Hole Drilling Completed: 1200 hrs. 12/12/85

Recorded by: Dunlavy Driller: Mike O'Keefe Company: O'Keefe

Drill Method: Cable Tool

Drilling Fluids Used: Water

Pilot Hole Diameter: 5.5" Tool diameter

Reamed Hole Diameter: 7.5 " drive shoe

Total Depth Drilled: 63'

Total Depth Reamed: N/A

Total Depth Cased Below G.S.: 62'

Diameter and Type of Casing: 2" Flush Threaded PVC

Weight or Gage of Casing: SCH 40

Interval Perforated or Screened Below G.S.: 52'-62'

Target Aquifer: SBC Alluvium

Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		X
Well Test Pumped?		X
Water Samples Taken?		X
Material Samples Taken?	X	
E-Logs?		X

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
X	Other (specify) 0.01" factory slot

Static Water Level: 9.3' Date: 12/20/85 @ 1400 hrs.

Measuring Point Description/Elevation: Top of steel well protector/5455.23 (surveyed)

MP Height Above (+/-) or Below G.S.: +1.6

Well Annulus Completion Description: Colorado Silica Sand (20-40) mesh 62'-46'; Volclay bentonite pellets 46'-44'; Pioneer Concrete, Inc. pea gravel 44'-3'; bentonite plug 3'-2'; concrete grout steel well protector with lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0	1'	Topsoil; light brown silt; cover.
1'	3'	Fill material; concrete slabs, rebar, silt, sand.
3'	8'	Fill Material; dark brown to black silt; mostly wood chips.
8'	12'	Silty sand; silt (50%), sand (50%); dark brown to black silt; fine to medium subangular sand of granitic composition.
12'	22'	Silty sand; sand (60%), silt (40%); medium to fine sand with thin (approximately 0.5' layers of dark brown to black silts, some greenish mottling; alot of pyrite and micas possiblysometailings; coresample@ 12'.

22' 63' Sand; sand (90%); coarse, subrounded to subangular, clean sand; heaving; plenty of H_2O; core sample @ 28' A few gravels (5%), <1/4" @ 35'; silts are orangish-red @ approximately 25'; sands are heaving bad at 45'; very little silt; occasional gravels approximately 1/4" from 35' to 63'.

Field Parameters Measured While Drilling

Depth	S.C. (adjusted)
15'	312
22'	516
28'	785
35'	1050
50'	1600
63'	1590

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MONITORING WELL LOG

Hole Name

State: Montana County: Silver Bow Project: SBC CERCLA or Number: GS-15A (Deep) and GS-15B (Shallow)

Legal Descriptive

Location: T 3N R 8W Sec 24 Tract CAB Location: S. of SBC, Old Mn Reduction Plant

Date Hole 1530 hrs. Date Hole 1630 hrs. Drilling

Recorded by: Dunlavy Started: 12/12/85 Completed: 12/16/85 Driller: Mike O'Keefe Company: O'Keefe

Drill Method: Cable Tool | Drilling Fluids Used: Water | Pilot Hole Diameter: 5.5" Tool diameter | Reamed Hole Diameter: 7.5" drive shoe

Total Depth Drilled: 32' | Total Depth Reamed: N/A | Total Depth Cased Below G.S.: 32' | Diameter and Type of Casing: 2" Flush Threaded PVC

Weight or Gage of Casing: SCH 40 | Interval Perforated or Screened Below G.S.: 27'-32' A, 0'-15' B | Target Aquifer: SBC Alluvium | Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x .

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) 0.01" factory slot

Static Water Level: 9.48' A & 9.75' B Date: 12/17/85 @ 0420 hrs.

Measuring Point Description/Elevation: Top of steel well protector/5445.28 (Surveyed) | MP Height Above (+/-) or Below G.S.: +.92'

Well Annulus Completion Description: Dual completion; Colorado silica Sand (20-40) mesh 32'-25'; Volclay bentonite pellets 25'-24'; Native material 24'-17'; bentonite plug 17'-16'; (20-40) mesh 16'-3'; bentonite plug 3'-2'; concrete grout steel well protector with lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0	5'	Topsoil; light brown silt.
5'	13'	Slag; poured manganese slag; drills, but very slowly with cable tool. Drill to 13.5' with air rotary; manganese to 13.0'; S.W.L. = 8.5'; split spoon sample @ 13.5'.
13'	17'	Sand and manganese chips; sand (30%); with angular chips of manganese; sand is black, a few grains of white to pink feldspar; split spoon sample @ 15'; not much available H_2O, hole bails dry easily.
17'	25'	Sand; sand (95%); subangular to subrounded; poorly sorted sand; black manganese staining; split spoon sample @ 19.5'; very little fine grained material.

25' 29' Sand; sand (95%); clean heaving sand; no longer black, now has orangish to dark brown silts; composition of sand is same as above.

29' 32' Sand; sand (70%); coarse angular sand, with about 20% fine grained silt and clay; hole stays open; no H_2O to sample from bailer.

Field Parameters Measured While Drilling

Depth	S.C. (adjusted)
13.5'	330
15'	410
19.5'	520
27'	290
33'	320

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-01
Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: Ramsay Flats - 1/2 mile WSW of Ramsay
Recorded by: Braun Date Hole Started: 03/13/85 Date Hole Completed: 03/13/85 Driller: Jim Orr Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6 5/8" Reamed Hole Diameter: N/A
Total Depth Drilled: 26.5' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 26.5' Diameter and Type of Casing: flush threaded 4" PVC
Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 26'-16' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		X
Well Test Pumped?		X
Water Samples Taken?		X
Material Samples Taken?	X	
E-Logs?		X

5' intervals

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
X	Other (specify) .030" factory slot

Static Water Level: 9.1' Date: 03/13/85
Measuring Point Description/Elevation: Recorder housing base; ~~5305'~~ 5297.7 (surveyed) ~~(topo map)~~ MP Height Above (+/-) or Below G.S.: + 1.5'
Well Annulus Completion Description: 8-14 mesh inert silica sand 26.5'-13', .25' bent. pellets; cuttings 12.75'-2'; 0.25' bent. pellets; grout-in recorder housing 1.75' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.25'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting iron stain, qtz., f-spar., mica, mafics; forms clay-matrix aggregates, scattered wood frags.; frost out at 3'; water seep at 3'.
4.25'	9.0'	Silt; black; sandy; sandier with depth grading to very-fine grained sand with slight greenish tinge. Saturated at about 8 feet; scattered small subangular gravel at 8.5 to 9 feet.
9.0'	12'	Gravel; light to medium gray, light brown, brown, very poor sorting, angular-subangular; quartz, feldspar, mica; rock fragments up to .75 inch diameter.
12'	20'	Silty sand and gravel; lt.-med. gray, lt. brown, brown, v. poor sorting, same lith as above; some water at 15'; v. clayey in part.
20'	26.5'	Claystone, siltstone; lt. gray-green, blocky, greasy in texture, mica flakes.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-02
Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 8' S of TS-01, Ramsay Flats
Recorded by: Braun Date Hole Started: 03/13/85 1500 hrs Completed: 03/13/85 1545 hrs. Driller: Jim Orr Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6 5/8" Reamed Hole Diameter: N/A
Total Depth Drilled: 7.6' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 7.6' Diameter and Type of Casing: flush threaded 4" PVC
Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 7'-0' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	5' intervals
E-Logs?		x

Method Perforated or Screened
- ____ No casing in hole.
- ____ Open bottom only.
- ____ Slotted with Mill's Knife.
- ____ Slotted with a torch.
- ____ Screened by pulling casing.
- ____ Saw cut.
- x Other (specify) .030"factory slot

Static Water Level: 7.3' Date: 03/13/85
Measuring Point Description/Elevation: Recorder housing base; ~~5305'~~ (~~topo map~~) 5297.4 (surveyed) MP Height Above (+/-) or Below G.S.: + 1.5'
Well Annulus Completion Description: 8-14 inert silica mesh sand 7.5'-2', .25 bent. pellets; grout-in recorder housing 1.75' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.25'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting iron stain, qtz., f-spar., mica, mafics; forms clay-matrix aggregates, scattered wood frags.; frost out at 3'; water seep at 3'.
4.25'	7.6'	Silt; black; sandy; sandier with depth grading to very-fine grained sand with slight greenish tinge.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-03
Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 10' W of TS-01, Ramsay Flats
Recorded by: Braun Date Hole Started: 03/14/85 Date Hole Completed: 03/14/85 Drilling Driller: Jim Orr Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6 5/8" Reamed Hole Diameter: N/A
Total Depth Drilled: 27' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 27' Diameter and Type of Casing: flush threaded 2" PVC
Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 26.5'-16.5' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO	Method Perforated or Screened	
Well Developed?		x		No casing in hole.
Well Test Pumped?		x		Open bottom only.
Water Samples Taken?		x		Slotted with Mill's Knife.
Material Samples Taken?	x		5' intervals	Slotted with a torch.
E-Logs?		x		Screened by pulling casing.
				Saw cut.
			x	Other (specify) .030"factory slot

Static Water Level: 9.67' Date: 03/15/85
Measuring Point Description/Elevation: Top of well protector; ~~5305'~~ ~~(topo map)~~ 5297.5' (surveyed) MP Height Above (+/-) or Below G.S.: + 2.15'
Well Annulus Completion Description: Sand pack 27'-13', .25' bent. pellets; sand-gravel fill 12.5'-2', .25' bent. pellets; grout-in well protector 1.75' to surface.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.25'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting iron stain, qtz., f-spar., mica, mafics; forms clay-matrix aggregates, scattered wood frags.; frost out at 3'; water seep at 3'.
4.25'	9.0'	Silt; black; sandy; sandier with depth grading to very-fine grained sand with slight greenish tinge. Saturated at about 8 feet; scattered small subangular gravel at 8.5 to 9 feet.
9.0'	12'	Gravel; light to medium gray, light brown, brown, very poor sorting, angular-subangular; quartz, feldspar, mica; rock fragments up to .75 inch diameter.
12'	20'	Silty sand and gravel; lt.-med. gray, lt. brown, brown, v. poor sorting, same lith as above; some water at 15'; v. clayey in part.
20'	27'	Claystone, siltstone; lt. gray-green, blocky, greasy in texture, mica flakes.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-04
Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 40' W of TS-01, Ramsay Flats
Recorded by: Braun Date Hole Started: 03/14/85 Date Hole 1215 hrs Completed: 03/14/85 Date Hole 1530 hrs. Driller: Jim Orr Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6 5/8" Reamed Hole Diameter: N/A
Total Depth Drilled: 27' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 27' Diameter and Type of Casing: flush threaded 2" PVC
Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 26'-16' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO	Method Perforated or Screened
Well Developed?		x	No casing in hole.
Well Test Pumped?		x	Open bottom only.
Water Samples Taken?		x	Slotted with Mill's Knife.
Material Samples Taken?	x		5' intervals Slotted with a torch.
E-Logs?		x	Screened by pulling casing.
			Saw cut.
			x Other (specify) .030"factory slot

Static Water Level: 9.5' Date: 03/14/85
Measuring Point Description/Elevation: Top of well protector; ~~5305'~~ ~~(topo map)~~ 5247.2 (surveyed) MP Height Above (+/-) or Below G.S.: + 2.0'
Well Annulus Completion Description: Sand pack 27'-13', .25' bent. pellets; sand fill 12.75'-2', .25' bent. pellets; grout-in well protector 1.75' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.25'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting iron stain, qtz., f-spar., mica, mafics; forms clay-matrix aggregates, scattered wood frags.; frost out at 3'; water seep at 3'.
4.25'	9.0'	Silt; black; sandy; sandier with depth grading to very-fine grained sand with slight greenish tinge. Saturated at about 8 feet; scattered small subangular gravel at 8.5 to 9 feet.
9.0'	12'	Gravel; light to medium gray, light brown, brown, very poor sorting, angular-subangular; quartz, feldspar, mica; rock fragments up to .75 inch diameter.
12'	20'	Silty sand and gravel; lt.-med. gray, lt. brown, brown, v. poor sorting, same lith as above; some water at 15'; v. clayey in part.
20'	26'	Claystone, siltstone; lt. gray-green, blocky, greasy in texture, mica flakes.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-05
Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 20' S of TS-01, Ramsay Flats
Date Hole 1530 hrs Date Hole 1800 hrs. Drilling
Recorded by: Braun Started: 03/14/85 Completed: 03/14/85 Driller: Jim Orr Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6 5/8" Reamed Hole Diameter: N/A
Total Depth Drilled: 27' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 27' Diameter and Type of Casing: flush threaded 2" PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 26'-16' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO	Method Perforated or Screened
Well Developed?		x	No casing in hole.
Well Test Pumped?		x	Open bottom only.
Water Samples Taken?		x	Slotted with Mill's Knife.
Material Samples Taken?	x		5' intervals Slotted with a torch.
E-Logs?		x	Screened by pulling casing.
			Saw cut.
			x Other (specify) .030"factory slot

Static Water Level: 9.86' Date: 03/15/85
Measuring Point Description/Elevation: Top of well protector; ~~5305'~~ (~~topo map~~) 5247.6' (survey) MP Height Above (+/-) or Below G.S.: + 2.40'
Well Annulus Completion Description: Sand pack 27'-13'; .25' bent. pellets; sand fill 12.75'-2', .25' bent. pellets; grout-in well protector 1.75' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.25'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting iron stain, qtz., f-spar., mica, mafics; forms clay-matrix aggregates, scattered wood frags.; frost out at 3'; water seep at 3'.
4.25'	9.0'	Silt; black; sandy; sandier with depth grading to very-fine grained sand with slight greenish tinge. Saturated at about 8 feet; scattered small subangular gravel at 8.5 to 9 feet.
9.0'	12'	Gravel; light to medium gray, light brown, brown, very poor sorting, angular-subangular; quartz, feldspar,mica; rock fragments up to .75 inch diameter.
12'	20'	Silty sand and gravel; lt.-med. gray, lt. brown, brown, v. poor sorting, same lith as above; some water at 15'; v. clayey in part.
20'	26'	Claystone, siltstone; lt. gray-green, blocky, greasy in texture, mica flakes.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-06
Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 15' S of TS-02, Ramsay Flats
Recorded by: Braun Date Hole Started: 03/15/85 Date Hole Completed: 03/15/85 Driller: Jim Orr Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6 5/8" Reamed Hole Diameter: N/A
Total Depth Drilled: 8' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8' Diameter and Type of Casing: 2" PVC flush threaded

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 7'-2' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO	Method Perforated or Screened	
Well Developed?		x		No casing in hole.
Well Test Pumped?		x		Open bottom only.
Water Samples Taken?		x		Slotted with Mill's Knife.
Material Samples Taken?	x		5' intervals	Slotted with a torch.
E-Logs?		x		Screened by pulling casing.
				Saw cut.
			x	Other (specify) .030"factory slot

Static Water Level: 9.75' Date: 03/18/85
Measuring Point Description/Elevation: Top of well protector; ~~5305'~~ 5297.5 (surveyed) ~~(topo map)~~ MP Height Above (+/-) or Below G.S.: + 2.5'
Well Annulus Completion Description: Sand pack 8'-15';.25' bent. pellets; grout-in well protector 1.25' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.25'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting iron stain, qtz., f-spar., mica, mafics; forms clay-matrix aggregates, scattered wood frags.; frost out at 3'; water seep at 3'.
4.25'	8.0'	Silt; black; sandy; sandier with depth grading to very-fine grained sand with slight greenish tinge.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-07
Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 15' E of TS-02, Ramsay Flats
Recorded by: Braun Date Hole Started: 03/15/85 Date Hole Completed: 03/15/85 Driller: Jim Orr Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6 5/8" Reamed Hole Diameter: N/A
Total Depth Drilled: 7.5' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 7.5' Diameter and Type of Casing: flush threaded 2" PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 7'-2' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO	Method Perforated or Screened
Well Developed?		x	No casing in hole.
Well Test Pumped?		x	Open bottom only.
Water Samples Taken?		x	Slotted with Mill's Knife.
Material Samples Taken?	x		5' intervals
E-Logs?		x	Slotted with a torch.
			Screened by pulling casing.
			Saw cut.
			x Other (specify) .030"factory slot

Static Water Level: 9.67' Date: 03/18/85
Measuring Point Description/Elevation: Top of well protector; ~~5305' (topo map)~~ 5297.6 (surveyed) MP Height Above (+/-) or Below G.S.: + 2.39'
Well Annulus Completion Description: Sand pack 7.5'-1.5';.25' bent. pellets; grout-in well protector 1.25' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.25'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting iron stain, qtz., f-spar., mica, mafics; forms clay-matrix aggregates, scattered wood frags.; frost out at 3'; water seep at 3'.
4.25'	7.5'	Silt; black; sandy; sandier with depth grading to very-fine grained sand with slight greenish tinge.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-12
Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: approx. 300 feet south of TS-01, Ramsay Flats
Recorded by: Dunlavy Date Hole Started: 04/02/85 Date Hole Completed: 04/02/85 Driller: Braun Dunlavy/ Drilling Company: Stiller and Assoc.
Drill Method: Bucket Auger Drilling Fluids Used: None Pilot Hole Diameter: 4" Reamed Hole Diameter: N/A
Total Depth Drilled: 10' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 10' Diameter and Type of Casing: Cemented 2" PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 10'-8' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
x	Saw cut.
x	Other (specify) Open Bottom

Static Water Level: 8.5' Date: 04/02/85
Measuring Point Description/Elevation: Top of PVC / 5296.6 (surveyed) MP Height Above (+/-) or Below G.S.: + 8'
Well Annulus Completion Description: Sand pack 10'-14', .25' bent. pellets; tailings fill 4'-1.5', grout in well protector 1.5' to surface.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	3'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting, iron stain, qtz., f-spar., mica, mafics; frost out at 3'.
3'	3.5'	Sand, fine grained; mod.-poor sorting, qtz., f-spar, micas, mafics, granite sand.
3.5'	7.5'	Clay; dark brown to gray, green, sticky, cohesive, reduces micas.
7.5'	10'	Sand; coarse, mod.-poor sorting, rounded, mostly qtz. and mafics, little f-spar, dark gray-green, coarse gravels .5-2" at 10'.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-13
Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: approx. 300 feet south of TS-01, Ramsay Flats
Recorded by: Dunlavy Date Hole Started: 04/02/85 Date Hole Completed: 04/02/85 Dunlavy/ Drilling Driller: Braun Company: Stiller and Assoc.
Drill Method: Bucket Auger Drilling Fluids Used: None Pilot Hole Diameter: 4" Reamed Hole Diameter: N/A
Total Depth Drilled: 10' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 10' Diameter and Type of Casing: Cemented 2" PVC

Weight or Gage of Casing: Sch. 40 Interval Perforated or Screened Below G.S.: 10'-8' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?	___	x
Well Test Pumped?	___	x
Water Samples Taken?	___	x
Material Samples Taken?	___	x
E-Logs?	___	x

Method Perforated or Screened
___ No casing in hole.
___ Open bottom only.
___ Slotted with Mill's Knife.
___ Slotted with a torch.
___ Screened by pulling casing.
x Saw cut.
x Other (specify) Open Bottom

Static Water Level: 6.7' Date: 04/02/85
Measuring Point Description/Elevation: Top of PVC / 5294.4 (surveyed) MP Height Above (+/-) or Below G.S.: + 8'
Well Annulus Completion Description: Sand pack 10'-14', .25' bent. pellets; tailings fill 4'-1.5', grout in well protector 1.5' to surface.

Remarks: _____

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	3.5'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting, iron stain, qtz., f-spar., mica, mafics; frost out at 3'.
3.5'	4.0'	Sand, fine grained; mod.-poor sorting, qtz., f-spar, micas, mafics, granite sand.
4.0'	7.0'	Clay; dark brown to gray, green, sticky, cohesive, reduces micas, olive green @ 6', mica throughout.
7.0'	10'	Sand; coarse, mod.-poor sorting, mod.-rounded, mostly qtz., dark gray-green, loose caving sand.

DRAFT

ATTACHMENT III-B
SILVER BOW CREEK MONITOR WELL DEVELOPMENT LOGS

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-01

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 8W Sec. 17 Tract CDDD

Well Location (Narrative Desc.) North bank of Silver Bow Creek, approximately 1/2 mile west of Rocker.

Well Depth (Ft.) 14.5' Diameter (In.) 4" Perf. Interval 9.5'-14.5'

Static Water Level 3.39 Stick up +1.6' M.P. Desc. Floor of recorder housing.

Meas. Date/Time 2/6/85:1412 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 2/6/85 / 2/7/85 Start 1430 / 0830 Finished 1715 / 0945 Total Development Time 4hrs.

Est. Yield at Start 1-2 gpm Est. Yield at End 1-2 gpm

Equipment: (Bailer) Sand Pump Compressor (Surge Block) Drilling Other (Specify)

Desc. of Equipment Hand bailer and 4" custom surge block.

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear becoming silty At End Fairly clear water, suspended silts.

Static Water Level
After Development : Time After Dev. Ended 10 min SWL 4.1' Trend Slow

Operator Pat Dunlavy Water Quality Samples Taken: Yes (No)

Remarks: Easy to hand bail well dry. Slow recovery. Surged quite a bit of silts into hole and bailed out, but still getting some fine silts in hole.

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-02

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 8W Sec. 17 Tract CDDD

Well Location (Narrative Desc.) North bank of Silver Bow Creek, approximately 1/2 mile west of Rocker.

Well Depth (Ft.) 6.2' Diameter (In.) 4" Perf. Interval 1'-6'

Static Water Level 4.3 Stick up +2.2' M.P. Desc. Floor of recorder housing.

Meas. Date/Time 2/6/85:1425 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 2/6/85 Start 1440 Finished 1730 Total Development Time 4hrs.
2/7/85 0840 0950

Est. Yield at Start <1 gpm Est. Yield at End <1 gpm

Equipment: (Bailer) Sand Pump Compressor (Surge Block) Drilling _____ Other (Specify)

Desc. of Equipment Hand bailer and 4" custom surge block.

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear turned silty At End Silty

Static Water Level
After Development : Time After Dev. Ended 10 min SWL 4.9' Trend Slow

Operator Pat Dunlavy Water Quality Samples Taken: Yes (No)

Remarks: Very little water in hole, can almost surge all water out, bails dry with 2-3 bails. Did not clear up.

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-03

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 9W Sec. 13 Tract DCBC

Well Location (Narrative Desc.) North bank of Silver Bow Creek, near the town of Silver Bow.

Well Depth (Ft.) 23 **Diameter (In.)** 4" **Perf. Interval** 13'-23'

Static Water Level 6.35 **Stick up** +1.2' **M.P. Desc.** Floor of recorder housing.

Meas. Date/Time 2/6/85:1015 hrs. **Aquifer** Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 2/6/85 **Start** 1030 **Finished** 1630 **Total Development Time** 4hrs.
2/7/85 0900 0100

Est. Yield at Start 5 gpm **Est. Yield at End** 5 gpm

Equipment: (Bailer) Sand Pump Compressor (Surge Block) Drilling _____ Other (Specify)

Desc. of Equipment Hand bailer and 4" custom surge block.

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear At End Clear at top some suspended silts.

Static Water Level
After Development : Time After Dev. Ended 1050 **SWL** 6.32' **Trend** Same

Operator Pat Dunlavy **Water Quality Samples Taken:** Yes (No)

Remarks: Started to get clear after bailing approximately 30 gallons and no more surging.

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-04

WELL DATA

PROJECT: Name SBC CERCLA **State** Montana **County** Silver Bow

Location: T 3N R 9W Sec. 13 Tract DCBC

Well Location (Narrative Desc.) North bank of Silver Bow Creek, near the town of Silver Bow.

Well Depth (Ft.) 8' **Diameter (In.)** 4" **Perf. Interval** 3'-8'

Static Water Level 7.66 **Stick up** +1.4' **M.P. Desc.** Floor of recorder housing.

Meas. Date/Time 2/6/85:1015 hrs. **Aquifer** Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 2/6/85 **Start** 1030 **Finished** 1630 **Total Development Time** 7hrs.
2/7/85 0900 0100

Est. Yield at Start <1 gpm **Est. Yield at End** <1 gpm

Equipment: (Bailer) Sand Pump Compressor (Surge Block) Drilling _____ Other (Specify)

Desc. of Equipment Hand bailer and 4" custom surge block.

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear **At End** Silty

Static Water Level
After Development : Time After Dev. Ended 1100 **SWL** 8.1' **Trend** Slow, same as before.

Operator Pat Dunlavy **Water Quality Samples Taken: Yes** (No)

Remarks: Not enough water to surge up and down. Just surged sediments in to hole and bailed. Got some coarse sands and inert frac sand at end.

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-05

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 9W Sec. 16 Tract BCD

Well Location (Narrative Desc.) Miles Crossing, Konda Ranch, approximately 75' N of SS-14.

Well Depth (Ft.) 29.5' **Diameter (In.)** 4" **Perf. Interval** 29'-19'

Static Water Level 7.3 **Stick up** +1.9' **M.P. Desc.** Top of steel casing.

Meas. Date/Time 3/19/85:0920 hrs. **Aquifer** Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 3/19/85 **Start** 0925 **Finished** 0945 **Total Development Time** 20 min

Est. Yield at Start app. 5 gpm **Est. Yield at End** >10 gpm

Equipment: Bailer Sand Pump (Compressor) Surge Block Drilling _____ Other (Specify)

Desc. of Equipment 100 cfm Ingersol-Rand compressor with 6' stinger

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: **At Start** Dark brown to red **At End** Clear

Static Water Level After Development : **Time After Dev. Ended** 1 min **SWL** 7.6' **Trend** Very Rapid

Operator: Pat Dunlavy **Water Quality Samples Taken:** (Yes) (No) ~~pH & DO~~

Remarks: Very muddy at first, after only about 2 min. Water started to clear up and there was a significant increase in yield.

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-06

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 9W Sec. 16 Tract BDC

Well Location (Narrative Desc.) Miles Crossing, Konda Ranch, approx. 150 feet East of GS-05.

Well Depth (Ft.) 29.5' Diameter (In.) 4" Perf. Interval 29'-19'

Static Water Level 7.42 Stick up +1.9' M.P. Desc. Top of steel casing.

Meas. Date/Time 3/19/85:0830 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 3/19/85 Start 0830 Finished 0920 Total Development Time 50 min

Est. Yield at Start <1 gpm Est. Yield at End >1 gpm

Equipment: Bailer Sand Pump (Compressor) Surge Block Drilling _____ Other (Specify)

Desc. of Equipment 100 cfm Ingersol-Rand with 6' stinger.

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Dark brown, turbid At End Milky White to clear.

Static Water Level After Development : Time After Dev. Ended 2 min / 5 min SWL 9.73' / 8.20' Trend Rapid Recovery

Operator Pat Dunlavy Water Quality Samples Taken: (Yes) No ~~pH & DO~~

Remarks: Cleaned up fairly well, obvious increase in yield. Very rapid recovery.

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-07

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 7W Sec. 19 Tract AAC

Well Location (Narrative Desc.): South East corner of Butte SBC City-County Shop complex.

Well Depth (Ft.) 160' Diameter (In.) 4" Perf. Interval 130'-160'

Static Water Level 23.80 Stick up +2.0' M.P. Desc. Top of steel casing.

Meas. Date/Time 12/18/85 0900 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 12/18/85 Start 0915 Finished 1015 Total Development Time 1 hour

Est. Yield at Start approx. 5 gpm Est. Yield at End approx. 5 gpm

Equipment: Bailer Sand Pump Compressor Surge Block Drilling _____
Other (Specify)

Desc. of Equipment 100 cfm Smith (Dry Air)

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear (30 seconds), then very turbid.

At End Fairly clear, very slight siltiness

Static Water Level After
Development : Time After Dev. Ended 1020 SWL 30.3' Trend Fast Recovery

Operator Pat Dunlavy Water Quality Samples Taken: No

Remarks: Cleaned up pretty well

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-08

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 7W Sec. 19 Tract CBA

Well Location (Narrative Desc.) 100' South of George adjacent to MSD

Well Depth (Ft.) 145.5' Diameter (In.) 4" PVC Perf. Interval 125.5'-145.5'

Static Water Level 11.29 Stick up +1.35 M.P. Desc. Top of steel

Meas. Date/Time 12/18/85 1215 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 12/18/85 Start 1215 Finished 1250 Total Development Time 40 min

Est. Yield at Start approx. 5 gpm Est. Yield at End approx. 5 gpm

Equipment: Bailer Sand Pump Compressor Surge Block Drilling _____
Other (Specify)

Desc. of Equipment 100 cfm Smith Compressor (Dry Air)

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear approximately 10 sec., then very turbid.

At End Clear

Static Water Level After
Development : Time After Dev. Ended 1255 SWL 50' Trend Very quick recovery but slowing

Operator Pat Dunlavy Water Quality Samples Taken: No

Remarks:

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-09

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 7W Sec. 19 Tract CBA

Well Location (Narrative Desc.) 10' South East of GS-08

Well Depth (Ft.) 75.5' Diameter (In.) 4" PVC Perf. Interval 60.5'-75.5'

Static Water Level 10.32' Stick up +1.10' M.P. Desc. Top of steel

Meas. Date/Time 12/18/85 1215 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 12/18/85 Start 1300 Finished 1330 Total Development Time 30 min

Est. Yield at Start approx. 5 gpm Est. Yield at End approx. 5 gpm

Equipment: Bailer Sand Pump Compressor Surge Block Drilling _____
Other (Specify)

Desc. of Equipment 100 cfm Smith Compressor, (Dry Air)

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear at first, then very turbid

At End Fairly clear

Static Water Level After Development ; Time After Dev. Ended 1332 SWL 40' Trend Recovery is very quick

Operator Pat Dunlavy Water Quality Samples Taken: No

Remarks:

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-10A

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 7W Sec. 19 Tract AAC

Well Location (Narrative Desc.) 10'-15' West of GS-07

Well Depth (Ft.) 110' Diameter (In.) 2" Perf. Interval 100'-110'

Static Water Level 20.3 Stick up +.8' M.P. Desc. Top of steel

Meas. Date/Time 1/07/86 1000 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 1/07/86 Start 1000 Finished 1030 Total Development Time 30 min

Est. Yield at Start approx. 5 gpm Est. Yield at End approx. 5 gpm

Equipment: Bailer Sand Pump Compressor Surge Block Drilling _____
Other (Specify)

Desc. of Equipment 100 cfm Smith compressor (Dry Air), Garden Hose

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear At End Slightly silty

Static Water Level After Development : Time After Dev. Ended 1035 SWL 60.0' Trend Fairly Quick

Operator P. Dunlavy, D. Hazen Water Quality Samples Taken: No

Remarks: Used rubber garden hose to blow out approximately 60' of 20-40 mesh frac sand, Total Depth = 110'

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-10B

WELL DATA

PROJECT: Name SBC_CERCLA State Montana County Silver_Bow

Location: T 3N R 7W Sec. 19 Tract AAC

Well Location (Narrative Desc.) 10'-15'_West_of_GS-07

Well Depth (Ft.) 29' Diameter (In.) 2" Perf. Interval 19'-29'

Static Water Level 19.9 Stick up +.8' M.P. Desc. Top_of_steel

Meas. Date/Time 12/18/85 0900 hrs. Aquifer Silver_Bow_Creek_Alluvium_Tailings

DEVELOPMENT DATA

Date 12/18/85 Start 1015 Finished 1045 Total Development Time 30_min

Est. Yield at Start < 1 gpm Est. Yield at End < 1 gpm

Equipment: Bailer Sand Pump Compressor Surge Block Drilling _____
Other (Specify)

Desc. of Equipment 100_cfm_Smith_compressor_(Dry_Air)

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Very turbid At End Turbid

Static Water Level After
Development : Time After Dev. Ended 1046 SWL 29.3' Trend Can't tell

Operator Pat Dunlavy Water Quality Samples Taken: No

Remarks: Couldn't_evacuate_much_water_due_to_perforations_above_S.W.L.,

only_able to_blow_out fine mist.

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-11

WELL DATA

PROJECT: Name SBC_CERCLA State Montana County Silver_Bow

Location: T 3N R 7W Sec. 19 Tract CBA

Well Location (Narrative Desc.) 10' West of GS-09

Well Depth (Ft.) 18' Diameter (In.) 2" Perf. Interval 08'-18'

Static Water Level 11.15 Stick up +1.1' M.P. Desc. Top of steel

Meas. Date/Time 12/18/85 1215 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 12/18/85 Start 1330 Finished 1345 Total Development Time 15 min

Est. Yield at Start < 1 gpm Est. Yield at End < 1 gpm

Equipment: Bailer Sand Pump Compressor Surge Block Drilling _____
Other (Specify)

Desc. of Equipment 100 cfm Smith compressor (Dry Air)

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear mist At End Clear mist

Static Water Level After
Development : Time After Dev. Ended 1346 SWL 11.45' Trend Good recovery

did not evacuate much water.

Operator Pat Dunlavy Water Quality Samples Taken: No

Remarks: Can't evacuate much water due to perforations above S.W.L., only get a fine mist.

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-12

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 8W Sec. 24 Tract CBD

Well Location (Narrative Desc.) Near Missoula Gulch, approximately 500' South of Centennial Avenue.

Well Depth (Ft.) 29.5 Diameter (In.) 2" Perf. Interval 19.5'-29.5'

Static Water Level 9.62' Stick up +1.45 M.P. Desc. Top of steel

Meas. Date/Time 12/18/85 1540 hrs. Aquifer Missoula Gulch Alluvium

DEVELOPMENT DATA

Date 12/18/85 Start 1545 Finished 1605 Total Development Time 20 min

Est. Yield at Start > 10 gpm Est. Yield at End > 10 gpm

Equipment: Bailer Sand Pump Compressor Surge Block Drilling Other (Specify)

Desc. of Equipment 100 cfm Smith compressor (Dry Air)

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Turbid At End Clear

Static Water Level After Development : Time After Dev. Ended 1606 SWL 10.0' Trend Very Quick

Operator Pat Dunlavy Water Quality Samples Taken: No

Remarks:

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-13A

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 8W Sec. 24 Tract CBA

Well Location (Narrative Desc.) North of SBC approximately 200 yards South of Centennial Avenue

Well Depth (Ft.) 17.5' Diameter (In.) 4" Perf. Interval 12.5'-17.5'

Static Water Level 6.20 Stick up +1.62' M.P. Desc. Top of steel

Meas. Date/Time 12/18/85 1625 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 12/18/85 Start 1645 Finished 1715 Total Development Time 30 min

Est. Yield at Start approx. 5 gpm Est. Yield at End approx. 5 gpm

Equipment: Bailer Sand Pump Compressor Surge Block Drilling
Other (Specify)

Desc. of Equipment 100 cfm Smith compressor (Dry Air)

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Very turbid, black At End Fairly clear, slight turbidity

Static Water Level After
Development : Time After Dev. Ended 1716 SWL 7.0 Trend Fairly Quick

Operator Pat Dunlavy Water Quality Samples Taken: No

Remarks:

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. GS-14

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 7W Sec. 19 Tract CCD

Well Location (Narrative Desc.) approximately 200 yards South of GS-08

Well Depth (Ft.) 62' Diameter (In.) 2" Perf. Interval 52'-62'

Static Water Level 9.00' Stick up +1.6' M.P. Desc. Top of steel

Meas. Date/Time 12/18/85 1410 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 12/18/85 Start 1410 Finished 1500 Total Development Time 50 min

Est. Yield at Start < 1 gpm Est. Yield at End a< 1 gpm

Equipment: Bailer Sand Pump Compressor Surge Block Drilling _____
Other (Specify)

Desc. of Equipment 100 cfm Smith compressor (Dry Air)

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear, alot of 20-40 mesh frac sand.

At End Still mostly frac sand.

Static Water Level After
Development : Time After Dev. Ended N/A SWL N/A Trend _____

Operator Pat Dunlavy Water Quality Samples Taken: No ~~pH & DO~~

Remarks: Silica sand in hole at 22', able to blow sand out to 50', used rubber garden hose returned 1-7-86, blew out frac. sand, T.D. =62'.

Stiller and Associates, Inc. Belena, Montana

WELL DEVELOPMENT DATA Well No. GS-15A Deep
Well No. GS-15B Shallow

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 8W Sec. 24 Tract CAB

Well Location (Narrative Desc.) South of Silver Bow Creek at old Mn reduction, plant, two dual completed wells.

Well Depth (Ft.) 32' Diameter (In.) 2" PVC Perf. Interval 27-32' A, 0-15'B

Static Water Level 9.5'A and 9.8'B Stick up +0.9' M.P. Desc. Top of steel

Meas. Date/Time 12/18/85 1625 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 12/18/85 Start 1630 Finished 1645 Total Development Time 15 min

Est. Yield at Start < 1 gpm Est. Yield at End < 1 gpm

Equipment: Bailer Sand Pump Compressor Surge Block Drilling _____
Other (Specify)

Desc. of Equipment 100 cfm Smith compressor (Dry Air)

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Clear both A and B At End Clear A & B

Static Water Level After Development: Time After Dev. Ended 1646 SWL 9.5'A, 9.8'B Trend Can't tell

Operator Pat Dunlavy Water Quality Samples Taken: No

Remarks: Couldn't evacuate any water due to perforations above S.W.L. in both 15A and 15B.

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. TS-01

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 9W Sec. 22 Tract AAD

Well Location (Narrative Desc.) Ramsay Flats 1/2 mile WSW of Ramsay.

Well Depth (Ft.) 26.5' Diameter (In.) 4" Perf. Interval 26'-16'

Static Water Level 9.9' Stick up 1.5' MP Desc. Top of housing

Meas. Date/Time 3/14/85:1420 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 3/14/85 Start 1420 Finished 1520 Total Development Time 1 hour

Est. Yield at Start approx. 10 gpm Est. Yield at End approx. 10 gpm

Equipment: Bailer Sand Pump (Compressor) (Surge Block) Drilling _____ Other (Specify)

Desc. of Equipment Ingersol-Rand 100 cfs and 4" custom surge block

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Med. brown, turbid At End Fairly Clear

Static Water Level After Development : Time After Dev. Ended 1540 SWL 9.9' Trend Fast

Operator Pat Dunlavy Water Quality Samples Taken: (Yes) (No) ~~pH & DO~~

Remarks: Cleaned up fairly well. Water flowing clean with few, very fine sands.

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. TS-03

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 9W Sec. 22 Tract AAD

Well Location (Narrative Desc.) 10' W of TS-01, Ramsay Flats.

Well Depth (Ft.) 27' Diameter (In.) 2" Perf. Interval 26.5'-16.5'

Static Water Level 9.6' Stick up 2.2' MP Desc. Top of steel

Meas. Date/Time 3/19/85:1115 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 3/19/85 Start 1115 Finished 1210 Total Development Time 55 min

Est. Yield at Start <1 gpm Est. Yield at End <1 gpm

Equipment: Bailer Sand Pump (Compressor) Surge Block Drilling _____ Other (Specify)

Desc. of Equipment 100 cfm Ingersol-Rand and 2" custom surge block

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Dk. brown-red, turbid At End Milky White-Clear

Static Water Level After Development: Time After Dev. Ended 1 min SWL 9.7' Trend Quick Recovery

Operator Pat Dunlavy Water Quality Samples Taken: (Yes) No ~~pH & DO~~

Remarks:

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. TS-04

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 9W Sec. 22 Tract AAD

Well Location (Narrative Desc.) 20' W of TS-03

Well Depth (Ft.) 27.5' Diameter (In.) 4" Perf. Interval 26.5'-16.5'

Static Water Level 9.35' Stick up +2.0' MP Desc. Top of plastic @ mark

Meas. Date/Time 3/19/85:1220 hrs. Aquifer Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 3/19/85 Start 1220 Finished 1250 Total Development Time 30 min

Est. Yield at Start <1 gpm Est. Yield at End <1 gpm

Equipment: Bailer Sand Pump (Compressor) Surge Block Drilling ____ Other (Specify)

Desc. of Equipment 100 cfm Ingersol-Rand

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Very Dk. brown, turbid At End Milky White

Static Water Level After Development: Time After Dev. Ended 2 min SWL 9.5' Trend Slowing, but quick recovery.

Operator Pat Dunlavy Water Quality Samples Taken: (Yes) No ~~pH & DO~~

Remarks:

Stiller and Associates, Inc. Helena, Montana

WELL DEVELOPMENT DATA Well No. TS-05

WELL DATA

PROJECT: Name SBC CERCLA State Montana County Silver Bow

Location: T 3N R 9W Sec. 22 Tract AAD

Well Location (Narrative Desc.) 20' S of TS-01, Ramsay Flats

Well Depth (Ft.) 27' **Diameter (In.)** 4" **Perf. Interval** 26.5'-16.5'

Static Water Level 9.8' **Stick up** +2.4' **MP Desc.** Top of steel housing

Meas. Date/Time 3/19/85:1250 hrs. **Aquifer** Silver Bow Creek Alluvium

DEVELOPMENT DATA

Date 3/19/85 **Start** 1250 **Finished** 1320 **Total Development Time** 30 min

Est. Yield at Start approx. 1 gpm **Est. Yield at End** >1 gpm

Equipment: Bailer Sand Pump (Compressor) Surge Block Drilling _____ Other (Specify)

Desc. of Equipment 100 cfm Ingersol-Rand

Dev. Additives Used N/A

Desc. of Packer & Surface Seals N/A

Water Color & Turbidity: At Start Very muddy, turbid **At End** Milky-Clear

Static Water Level After Development: Time After Dev. Ended 2 min **SWL** 9.9' **Trend** Quick recovery.

Operator Pat Dunlavy **Water Quality Samples Taken:** (Yes) No ~~pH=5 DO~~

Remarks: Cleaned up real well, good flow, good recovery.

DRAFT

ATTACHMENT III-C
SILVER BOW CREEK TENSIOMETER AND LYSIMETER LITHOLOGIC LOGS

MultiTech

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-08

Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 20' WSW of TS-04, Ramsay Flats

Recorded by: Braun Date Hole Started: 03/13/85 Completed: 03/13/85 Driller: Jim Orr Drilling Company: O'Keefe

Drill Method: Cable Tool Drilling Fluids Used: N/A Pilot Hole Diameter: 6" Reamed Hole Diameter: N/A

Total Depth Drilled: 4.0' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: 2" PVC

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 3.2'-3.5' Target Aquifer: Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) Lysimeter

Static Water Level: Date:

Measuring Point Description/Elevation: 5305' (topo map) MP Height Above (+/-) or Below G.S.: N/A

Well Annulus Completion Description: .25' bent. pellets on bottom; 200 mesh silica/DI water slurry 4.0' to 2.0'; backfill with cuttings to 1';concrete grout in steel protector 1' to surface.

Remarks: Pulled lysimeter 6/12/85, unable to collect sample.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.0'	Tailings; orange-brown, buff, gray to black, v.f.-f. sand, silty and clayey inpart; poor-fair sorting; mineral stained zones; qtz., f-spar., mica, mafics; frost out at 3', water seep at 3'.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-09

Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 6' W of TS-08, Ramsay Flats

Recorded by: Braun Date Hole Started: 03/13/85 Date Hole 1515 hrs Completed: 03/13/85 Date Hole 1545 hrs. Driller: Jim Orr Drilling Company: O'Keefe

Drill Method: Cable Tool Drilling Fluids Used: N/A Pilot Hole Diameter: 6" Reamed Hole Diameter: N/A

Total Depth Drilled: 6.0 Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: N/A

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 5.2'-5.5' Target Aquifer: Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?	___	x
Well Test Pumped?	___	x
Water Samples Taken?	___	x
Material Samples Taken?	x	___
E-Logs?	___	x

Method Perforated or Screened

___	No casing in hole.
___	Open bottom only.
___	Slotted with Mill's Knife.
___	Slotted with a torch.
___	Screened by pulling casing.
___	Saw cut.
x	Other (specify) Lysimeter

Static Water Level: N/A Date: N/A

Measuring Point Description/Elevation: 5305' (topo map) MP Height Above (+/-) or Below G.S.: N/A

Well Annulus Completion Description: .25' bent. pellets on bottom; 200 mesh silica/DI water slurry 6.0' to4.0'; backfill with cuttings to 1.0'; concrete grout in steel protector 1' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.25'	Tailings; orange-brown, buff, gray to black, v.f.-f. sand, silty and clayey inpart; poor-fair sorting; iron/copper staining; qtz., f-spar., mica, mafics; frost out at 3', water seep at 3'.
4.25'	6.0'	Silt; black; sandy; sandier with depth grading to very fine grained sand with slight greenish tinge; saturated at about 8 feet; scattered small subangular gravel at 8.5' to 9.0'.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-10

Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 6' W of TS-09, Ramsay Flats

Recorded by: Braun Date Hole Started: 03/13/85 Date Hole Completed: 03/13/85 Driller: Jim Orr Drilling Company: O'Keefe

Drill Method: Cable Tool Drilling Fluids Used: N/A Pilot Hole Diameter: 6" Reamed Hole Diameter: N/A

Total Depth Drilled: 8.0 Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: N/A

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 7.2'-7.5' Target Aquifer: SBC Qal Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) Lysimeter

Static Water Level: N/A Date: N/A

Measuring Point Description/Elevation: 5305' (topo'map) MP Height Above (+/-) or Below G.S.: N/A

Well Annulus Completion Description: .25' bent. pellets on bottom; 200 mesh silica/DI water slurry 8.0' to 4.0'; backfill with cuttings to 1'; concrete grout-in steel protector 1' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.25'	Tailings; orange-brown, buff, gray to black, v.f.-f. sand, silty and clayey inpart; poor-fair sorting; iron/copper staining; qtz., f-spar., mica, mafics; frost out at 3', water seep at 3'.
4.25'	10.0'	Silt; black; sandy; sandier with depth grading to very fine grained sand with slight greenish tinge; saturated at about 8 feet; scattered small subangular gravel at 8.5' to 9.0'.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-11
Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 6' W of TS-10, Ramsay Flats
Recorded by: Braun Date Hole Started: 03/14/85 Date Hole Completed: 03/14/85 Driller: Jim Orr Drilling Company: O'Keefe
Drill Method: Cable Tool Drilling Fluids Used: Water Pilot Hole Diameter: 6" Reamed Hole Diameter: N/A
Total Depth Drilled: 10 Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: N/A

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 9.2'-9.5' Target Aquifer: SBC Qal Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened
- ____ No casing in hole.
- ____ Open bottom only.
- ____ Slotted with Mill's Knife.
- ____ Slotted with a torch.
- ____ Screened by pulling casing.
- ____ Saw cut.
- x Other (specify) Lysimeter

Static Water Level: N/A Date: N/A
Measuring Point Description/Elevation: 5305' (topo map) MP Height Above (+/-) or Below G.S.: N/A
Well Annulus Completion Description: .25' bent. pellets on bottom; 200 mesh silica/DI water slurry 10.0' to 4.0'; backfill with cuttings to 1'; concrete grout-in steel protector 1' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	8'	Tailings; orange-brown, buff, gray to black, v.f.-f. sand, silty and clayey inpart; poor-fair sorting; iron/copper staining; qtz., f-spar., mica, mafics; frost out at 3', water seep at 3'.
8'	9.5'	Sandy gravel; brown, purple, orange, buff; silty and clayey, fair to poor sorting; mineralized staining; saturated.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-14
Legal Location: T 3N R 9W Sec 22 Tract ABA Descriptive Location: approx. 4' S. of TST-04
Recorded by: Dunlavy Date Hole Started: 06/12/85 Date Hole Completed: 06/12/85 Driller: Braun Drilling Company: Stiller and Assoc.
Drill Method: Bucket Auger Drilling Fluids Used: None Pilot Hole Diameter: 4" Reamed Hole Diameter: N/A
Total Depth Drilled: 7.0' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing:

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 6.5'-6.8' Target Aquifer: SBC Alluvium Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) Lysimeter

Static Water Level: N/A Date:
Measuring Point Description/Elevation: 5303' (Topo map) MP Height Above (+/-) or Below G.S.: N/A
Well Annulus Completion Description: 200 mesh silica/DI water slurry 7.0'-2.0'; backfill with cuttings to 1'; concrete grout in steel protector 1.0'-surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2.5'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting, iron stain, qtz., f-spar., mica, mafics.
2.5'	5.5'	Clayey, sandy, silt, dark brown-green, organics, roots, moist, cohesive.
5.5'	6.5'	Sand; med-fine grained, mod-sorted, qtz., feld, micas, water.
6.5'	6.8'	Sand; coarse, poorly sorted, qtz., feld.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-15
Legal Location: T 3N R 9W Sec 22 Tract ABA Descriptive Location: approx. 4' S. of TST-03
Recorded by: Dunlavy Date Hole Started: 06/12/85 Date Hole Completed: 06/12/85 Driller: Braun Drilling Company: Stiller and Assoc.
Drill Method: Bucket Auger Drilling Fluids Used: None Pilot Hole Diameter: 4" Reamed Hole Diameter: N/A
Total Depth Drilled: 5.0' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing:

Weight or Gage of Casing: N/A
Interval Perforated or Screened Below G.S.: 4.5'-4.8'
Target Aquifer: SBC Clay
Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened
- ___ No casing in hole.
- ___ Open bottom only.
- ___ Slotted with Mill's Knife.
- ___ Slotted with a torch.
- ___ Screened by pulling casing.
- ___ Saw cut.
- x Other (specify) Lysimeter

Static Water Level: N/A Date:
Measuring Point Description/Elevation: 5303' (Topo map)
MP Height Above (+/-) or Below G.S.: N/A
Well Annulus Completion Description: 200mesh silica/DI water slurry 5.0'-2.0'; backfill with cuttings to 1.0'; concrete grout steel protector1.0' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2.5'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting, iron stain, qtz., f-spar., mica, mafics.
2.5'	5.0'	Clayey, sandy, silt, dark brown-green, organics, roots, moist, cohesive.

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Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TS-16
Legal Location: T 3N R 9W Sec 22 Tract ABA Descriptive Location: approx. 4' S. of TST-02
Recorded by: Dunlavy Date Hole Started: 06/12/85 Date Hole Completed: 06/12/85 Driller: Braun Drilling Company: Stiller and Assoc.
Drill Method: Bucket Auger Drilling Fluids Used: None Pilot Hole Diameter: 4" Reamed Hole Diameter: N/A
Total Depth Drilled: 2.5' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing:

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 1.7'-2.0' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened
- ___ No casing in hole.
- ___ Open bottom only.
- ___ Slotted with Mill's Knife.
- ___ Slotted with a torch.
- ___ Screened by pulling casing.
- ___ Saw cut.
- x Other (specify) Lysimeter

Static Water Level: N/A Date:
Measuring Point Description/Elevation: 5303' (Topo map) MP Height Above (+/-) or Below G.S.:
Well Annulus Completion Description: 200 mesh silica/DI water slurry 2.5'-1.0'; backfill with cuttings 1.0' to .5'; concrete grout steel protector 1.0' to surface; lock.

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2.5'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting, iron stain, qtz., f-spar., mica, mafics.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

TENSIOMETER LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TST-01

Legal Location: T 3N R 9W Sec 22 Tract ABA Descriptive Location: approx. 600 feet west of TS-01

Recorded by: Dunlavy Date Hole Started: 05/08/85 Date Hole Completed: 05/08/85 Driller: Braun Drilling Company: Stiller and Assoc.

Drill Method: Drive Insertion Tool Drilling Fluids Used: None Pilot Hole Diameter: 5/8" Reamed Hole Diameter: N/A

Total Depth Drilled: 4.1' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: N/A

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 4.1'-3.8' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) Tensiometer

Static Water Level: N/A Date: N/A

Measuring Point Description/Elevation: 5303' (TOPO MAP) MP Height Above (+/-) or Below G.S.: N/A

Well Annulus Completion Description: N/A

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.1'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting, iron stain, qtz., f-spar., mica, mafics.

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TENSIOMETER LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TST-02

Legal Location: T 3N R 9W Sec 22 Tract ABA Descriptive Location: approx. 600' west of TS-01; 4' N. of TS-16.

Recorded by: Dunlavy Date Hole Started: 05/08/85 Date Hole Completed: 05/08/85 Driller: Braun Drilling Company: Stiller and Assoc.

Drill Method: Drive Insertion Tool Drilling Fluids Used: None Pilot Hole Diameter: 5/8" Reamed Hole Diameter: N/A

Total Depth Drilled: 3.3' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: N/A

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 3.3'-3.0' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) Tensiometer

Static Water Level: N/A Date: N/A

Measuring Point Description/Elevation: 5303' (topo map) MP Height Above (+/-) or Below G.S.: N/A

Well Annulus Completion Description: N/A

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	3.3'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting, iron stain, qtz., f-spar., mica, mafics.

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TENSIOMETER LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TST-03

Legal Location: T 3N R 9W Sec 22 Tract ABA Descriptive Location: approx. 600 feet west of TS-01;4' N. of TS-15

Recorded by: Dunlavy Date Hole Started: 05/08/85 Date Hole Completed: 05/08/85 Driller: Braun Drilling Company: Stiller and Assoc.

Drill Method: Drive Insertion Tool Drilling Fluids Used: None Pilot Hole Diameter: 5/8" Reamed Hole Diameter: N/A

Total Depth Drilled: 2.1' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: N/A

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 2.1'-1.8' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) Tensiometer

Static Water Level: N/A Date: N/A

Measuring Point Description/Elevation: 5303' (topo map) MP Height Above (+/-) or Below G.S.: N/A

Well Annulus Completion Description: N/A

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2.1'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting, iron stain, qtz., f-spar., mica, mafics.

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Consulting Hydrologists - Geologists - Engineers

TENSIOMETER LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TST-04

Legal Location: T 3N R 9W Sec 22 Tract ABA Descriptive Location: approx. 600' west of TS-01; 4' N. of TS-14.

Recorded by: Dunlavy Date Hole Started: 05/08/85 Date Hole Completed: 05/08/85 Driller: Braun Drilling Company: Stiller and Assoc.

Drill Method: Drive Insertion Tool Drilling Fluids Used: None Pilot Hole Diameter: 5/8" Reamed Hole Diameter: N/A

Total Depth Drilled: 1.1' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: N/A

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 1.1'-0.8' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) Tensiometer

Static Water Level: N/A Date: N/A

Measuring Point Description/Elevation: 5303' (topo map) MP Height Above (+/-) or Below G.S.: N/A

Well Annulus Completion Description: N/A

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1.1'	Tailings; med-orange, buff to gray, v.f.-f. sand, poor to moderate sorting, iron stain, qtz., f-spar., mica, mafics.

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Consulting Hydrologists - Geologists - Engineers

TENSIOMETER LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TST-05

Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 4' N. of TS-09, Ramsay Flats

Recorded by: Dunlavy Date Hole Started: 06/12/85 Date Hole Completed: 06/12/85 Driller: Dunlavy Drilling Company: Stiller and Assoc.

Drill Method: Insertion Tool Drive Drilling Fluids Used: None Pilot Hole Diameter: 5/8" Reamed Hole Diameter: N/A

Total Depth Drilled: 4.0' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: N/A

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S. 4.0'-3.7' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

- ____ No casing in hole.
- ____ Open bottom only.
- ____ Slotted with Mill's Knife.
- ____ Slotted with a torch.
- ____ Screened by pulling casing.
- ____ Saw cut.
- x Other (specify) Tensiometer

Static Water Level: N/A Date: N/A

Measuring Point Description/Elevation: 5305 Topo Map MP Height Above (+/-) or Below G.S.: N/A

Well Annulus Completion Description: N/A

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4'	Tailings; orange-brown, buff, gray to black, v.f.-f. sand, silty and clayey inpart; poor-fair sorting, iron stain, qtz., f-spar, mica, mafics.

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Consulting Hydrologists - Geologists - Engineers

TENSIOMETER LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TST-06

Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 4' N. of TS-10, Ramsay Flats

Recorded by: Dunlavy Date Hole Started: 06/12/85 Date Hole Completed: 06/12/85 Driller: Dunlavy Drilling Company: Stiller and Assoc.

Drill Method: Drive Insertion Tool Drilling Fluids Used: None Pilot Hole Diameter: 5/8" Reamed Hole Diameter: N/A

Total Depth Drilled: 5.0' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: N/A

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 5.0'-4.7' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?	____	x
Well Test Pumped?	____	x
Water Samples Taken?	____	x
Material Samples Taken?	____	x
E-Logs?	____	x

Method Perforated or Screened

- ____ No casing in hole.
- ____ Open bottom only.
- ____ Slotted with Mill's Knife.
- ____ Slotted with a torch.
- ____ Screened by pulling casing.
- ____ Saw cut.
- x Other (specify) Tensiometer

Static Water Level: N/A Date: N/A

Measuring Point Description/Elevation: 5305 (Topo Map) MP Height Above (+/-) or Below G.S.: N/A

Well Annulus Completion Description: N/A

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4'	Tailings; orange-brown, buff, gray to black, v.f.-f. sand, silty and clayey inpart; poor-fair sorting, iron stain, qtz., f-spar, mica, mafics.
4'	5'	Clay, orange-brown, fair sorting, organics, roots, fairly cohesive, silty, sandy, clay.

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Consulting Hydrologists - Geologists - Engineers

TENSIOMETER LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: TST-07

Legal Location: T 3N R 9W Sec 22 Tract AAD Descriptive Location: 4' N. of TS-11, Ramsay Flats

Recorded by: Dunlavy Date Hole Started: 06/12/85 Date Hole Completed: 06/12/85 Driller: Dunlavy Drilling Company: Stiller and Assoc.

Drill Method: Insertion Tool Drive Drilling Fluids Used: None Pilot Hole Diameter: 5/8" Reamed Hole Diameter: N/A

Total Depth Drilled: 6.0' Total Depth Reamed: N/A Total Depth Cased Below G.S.: N/A Diameter and Type of Casing: N/A

Weight or Gage of Casing: N/A Interval Perforated or Screened Below G.S.: 6.0'-5.7' Target Aquifer: SBC Tailings Packer Type and Depth Below G.S.: N/A

DURING INSTALLATION WAS:	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) Tensiometer

Static Water Level: N/A Date: N/A

Measuring Point Description/Elevation: 5305 (Topo Map) MP Height Above (+/-) or Below G.S.: N/A

Well Annulus Completion Description: N/A

Remarks:

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4'	Tailings; orange-brown, buff, gray to black, v.f.-f. sand, silty and clayey inpart; poor-fair sorting, iron stain, qtz., f-spar, mica, mafics.
4'	6'	Clay, orange-brown, fair sorting, organics, roots, fairly cohesive, silty, sandy, clay.

ATTACHMENT III-D
SILVER BOW CREEK NEUTRON PROBE LITHOLOGIC LOGS

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-01

Legal Location: T 3N R 9W Sec 13 Tract DC

Descriptive Location: Next to GS-03; Silver Bow Siding

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 10' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled the following intervals: 1-2' (1 1/4"); 3-4' (1 1/4"); 5-6' (1 1/2"); installed neutron access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	3'	Tailings; rust to gray; primarily sand; very fine grained; silty; oxidized; reducing with depth.
3'	5.5'	Silt; brown; slightly sandy; root frags throughout; scattered glass shards; abundant roots at 4.5 to 5 feet; copper enriched zone at 5 feet; saturated at 5.5 feet to 6 feet.
5.5'	6'	Clay; red; slightly silty.
6'	9'	Sand; gray; mod. well sorted; subrounded; slightly silty.
9'	10'	Gravel; gray, varicolored; small; poorly sorted; subrounded; sand matrix.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-02

Legal Location: T 3N R 9W Sec 13 Tract DC

Descriptive Location: 100 yards east of NP-01; Silver Bow Siding

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings

Drilling Fluids Used: None

Pilot Hole Diameter: 2 inch

Reamed Hole Diameter: N/A

Total Depth Drilled: 10'

Total Depth Reamed: N/A

Total Depth Cased Below G.S.: 9'

Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall

Interval Perforated or Screened Below G.S.: N/A

Target Aquifer: Vadose

Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Installed neutron access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	0.5	Tailings/gravel; varicolored; coarse.
0.5'	1'	Hard pan; maroon; hard; cemented sand and gravel; highly oxidized; iron stained.
1'	3'	Sand/gravel; gray to red; slightly silty; poorly sorted; subangular; very hard augering.
3'	7'	Sand/gravel; red; similar to above; water at 7 feet.
7'	10'	Gravel; varicolored; poorly sorted; subangular; sand matrix.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-03
Legal Location: T 3N R 9W Sec 13 Tract DC Descriptive Location: 50 feet north of GS-03; Silver Bow Siding
Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel
Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A
Total Depth Drilled: 10' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8' Diameter and Type of Casing: 2 inch aluminum
Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:
Measuring Point Description/Elevation: MP Height Above (+/-) or Below G.S.:
Well Annulus Completion Description:

Remarks: Samples obtained from the following intervals: 0-1' (1 1/2"); 3-4' (1 1/2"); installed neutron access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2.5'	Tailings; silty sands; highly oxidized.
2.5'	8'	Clay; gray; slightly silty; coarsens with depth; plastic; water at 6 feet.
8'	10'	Gravel; gray; silt-clay matrix; grades from fine-grained sand to medium gravel with depth.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-04

Legal Location: T 3N R 9W Sec 13 Tract DC Descriptive Location: 50 feet north west of NP-03 in veg. area; Silver Bow Siding

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 10' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8.8' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation: MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Samples obtained from the following intervals: 1-2' (2 1/4"); 3-4' (1 7/8"); installed neutron access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	5'	Silt; buff colored; roots, wood frags. common; slightly moist at 4 feet; clayey lenses throughout.
5'	10'	Clay; gray; silty; plastic; saturated at about 5.5 feet; buff colored at 9-10 feet.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-05

Legal Location: T 3N R 8W Sec 17 Tract DC

Descriptive Location: next to GS-01; Rocker area

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings

Drilling Fluids Used: None

Pilot Hole Diameter: 2 inch

Reamed Hole Diameter: N/A

Total Depth Drilled: 6'

Total Depth Reamed: N/A

Total Depth Cased Below G.S.: 4.5'

Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall

Interval Perforated or Screened Below G.S.: N/A

Target Aquifer: Vadose

Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Samples obtained from the following intervals: 1-2' (1 3/4"); installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1.5'	Tailings; brown to rust; sand/gravel; highly oxidized at 1 to 1.5 feet.
1.5'	5'	Sand; gray; very fine grained ; some oxidized nodules within 1.5 to 2 feet; significant oxidation at 3-5 feet; water at about 4 feet.
5'	6'	Silt; gray; sandy; scattered pyrite.

Stiller and Associates, Inc.
Consulting Hydrologists - Geologists - Engineers

MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-06

Legal Location: T 3N R 8W Sec 17 Tract DC

Descriptive Location: north of NP-05 approx. 100 feet in veg., Rocker area

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 8' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 6' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	0.5'	Silt; dark brown; slightly clayey; abundant root system; sandy zone at 0.4 to 0.5 feet.
0.5'	0.8'	Clay; gray; silty.
0.8'	5'	Sand; dark green to black; very fine grained; well sorted; silty; water at 4 feet.
5'	8'	Silt; buff blending to dark green; clayey; blocky; plastic.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-07

Legal Location: T 3N R 8W Sec 17 Tract DC

Descriptive Location: north of NP-06 in veg.; Rocker area

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings

Drilling Fluids Used: None

Pilot Hole Diameter: 2 inch

Reamed Hole Diameter: N/A

Total Depth Drilled: 9.5'

Total Depth Reamed: N/A

Total Depth Cased Below G.S.: 8'

Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall

Interval Perforated or Screened Below G.S.: N/A

Target Aquifer: Vadose

Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled the following intervals: 1-2' (1 3/4"); 3-4' (1 1/2"); installed neutron probe access tubes.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1.5'	Silt; light brown; clayey; abundant roots; loamy.
1.5'	7'	Silt; dark brown; clayey; occasional void; loamy.
7'	8'	Silt; dark brown; clayey; scattered pebbles; water at about 7.5 feet.
8'	9.5'	Clay; tan; plastic; very cohesive.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-08

Legal Location: T 3N R 8W Sec 17 Tract DC Descriptive Location: east of GS-01; Rocker area

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 7' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 5' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation: MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1.5'	Tailings; sand-silt; rust to bright orange; occasional gravel.
1.5'	7'	Sand/gravel; varicolored; poorly sorted; some silty lenses; subangular; siltier with depth; water at about 4.5 feet.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-09

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: south of NP-10; Ramsay Flats; adjacent to SBC

Recorded by: Grotbo Date Hole Started: 05/13/85 Date Hole Completed: 05/13/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 8' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 7.5' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation: MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled at the following intervals: 0-1'; 1-2'; 2-3'; installed neutron probe access tubes.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1'	Tailings; primarily sand; very fine to fine grained; silt matrix; mottled with oxidized material.
1'	4'	Silt; dark brown to light black; sandy; clayey zones scattered; slickensides common; scattered pyrite throughout; black clay at 3.5 to 4 feet.
4'	6'	Clay; light brown to light black; silty; scattered pyrite; slickensides at 5.5 feet.
6'	7.5'	Clay; as above; mottled at 7 feet with oxidized material; siltier with depth; becoming gray-brown at 6.5 feet.
7.5'	8'	Sand; dark green; fine to medium grained; pyrite rich; poorly sorted; subangular; saturated at 7.5 feet.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-10

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: south of NP-11; approx. 30 meters; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/13/85 Date Hole Completed: 05/13/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 9' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation: MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	3'	Tailings; red-brown to rust; mottled; primarily clayey silt; occasional root frag.; occasional enriched copper nodule; root zone 2.5 to 3 feet; highly oxidized; silty sand matrix.
3'	4.5'	Sand; varicolored; very fine to fine grained; moderately well sorted; subrounded; dry; root frags. throughout coated with green copper sulfide.
4.5'	6.5	Clay; black; silty; slightly moist; slightly mottled at 5.5 to 6 feet; root frags throughout; slickensides common.
6.5'	8.5'	Clay; red-brown; silty; appears slightly oxidized; mottled with oxidized material at 8 feet; pyrite rich.
8.5'	9'	Sand; dark green to black; fine to coarse; poorly sorted; subrounded; scattered pyrite;

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-11

Legal Location: T 3N R 9W Sec 22 Tract AA

Descriptive Location: 30 meters south of NP-12; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/13/85 Date Hole Completed: 05/13/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings

Drilling Fluids Used: None

Pilot Hole Diameter: 2 inch

Reamed Hole Diameter: N/A

Total Depth Drilled: 8'

Total Depth Reamed: N/A

Total Depth Cased Below G.S.: 7'

Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall

Interval Perforated or Screened Below G.S.: N/A

Target Aquifer: Vadose

Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled foot intervals 0-7' for soil moisture; installed neutron probe access tubes.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1'	Tailings; rust colored; silty; highly oxidized.
1	2.5'	Silt; brown to gray; slightly clayey; root frags. common.
2.5'	4'	Sand; varicolored; fine to medium; subangular to subrounded; poorly sorted; occasional root frags.; dry.
4'	6'	Silt; dark brown to black; slightly moist; scattered pyrite; mottled at 5-6 feet with oxidized material.
6'	8'	Sand; varicolored; poorly sorted; fine to coarse; scattered pyrite; subangular to subrounded; slightly mottled at 7.5 feet; saturated at 7 feet; green clayey substance at 8 feet-possible volcanic origin.

saturated at 8.5 feet.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-12
Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: Ramsay Flats
Recorded by: Grotbo Date Hole Started: 05/13/85 Date Hole Completed: 05/13/85 Driller: D. Noel Drilling Company: Noel
Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A
Total Depth Drilled: 8' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 7.5' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:
Measuring Point Description/Elevation:
MP Height Above (+/-) or Below G.S.:
Well Annulus Completion Description:

Remarks: Installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1'	Tailings; sand; very fine; silt matrix; highly oxidized; varicolored; oxidized lenses.
1'	2.5'	Tailings; silt; clayey; slightly moist; occasional root frags; scattered pebbles.
2.5'	4'	Sand; dark brown to black; very fine grained; silty; moderately well sorted; siltier with depth; root frags. common; slightly moist.
4'	6'	Silt; dark brown to black; clayey; sandy at 5-6 feet; root frags. throughtout; pyrite rich; reduced environment.
6'	8'	Sand; varicolored; moderately well sorted; medium to coarse; subrounded; primarily quartz; saturated at 6 feet; slightly grayer at 6 to 7 feet.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-13

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: south of NP-14; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/13/85 Date Hole Completed: 05/13/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 7.5' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 7' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation: MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled for soil moisture, foot increments 0 to 7.5 feet; installed neutron probe access tubes.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	5'	Tailings; orange to brown; primarily very fine sand; silt matrix; root frags. common 0.5 to 1 foot; clayier with depth; darker colored with depth.
5'	6'	Sand; varicolored; coarse; poorly sorted; reduced environment.
6'	7.5'	Sand/gravel; varicolored; poorly sorted; subangular to subrounded; primarily quartz; saturated at 6.5 to 7 feet.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-14

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: approx. 10 feet north of TS-01; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/13/85 Date Hole Completed: 05/13/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 9' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	4.25'	Tailings; gray to brown; primarily sandy silt; root frags. common; becoming sandier, more brown-black with depth; scattered pyrite.
4.25'	9'	Silt; black; sandy; sandier with depth grading to very-fine grained sand with slight greenish tinge. Saturated at about 8 feet; scattered small subangular gravel at 8.5 to 9 feet.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-15

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 9' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 7.5' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation: MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled the following intervals: 2-3' (1 3/4"); 5-6' (1 1/2"); 6-7' (2"); installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2.5'	Tailings; varicolored, orange to brown; primarily v.f.g. sand; dry; weakly cemented; slightly mottled at 1.5 feet to 2.5 feet.
2.5'	3'	Clay; black; silty; blocky; root frags. common; organic rich.
3	5.5'	Clay; dark gray; silty; blocky; occasional root frags.; some mottling evident.
5.5'	7.5'	Sand; varicolored; fine grained; moderately well sorted; subrounded; quartz rich; silty at 5.75 to 6 feet; slightly oxidized at 6 to 6.25 feet.
7.5'	8.5'	Gravel; small to medium; moderately well to well rounded; sand matrix; poorly sorted; saturated at 7.5 feet.
8.5'	9'	Silt; dark green; slightly clayey; pyrite rich; slightly limonitized.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-16

Legal Location: T 3N R 9W Sec 22 Tract AA

Descriptive Location: south of NP-17 approx. 24 meters

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings

Drilling Fluids Used: None

Pilot Hole Diameter: 2 inch

Reamed Hole Diameter: N/A

Total Depth Drilled: 10.5'

Total Depth Reamed: N/A

Total Depth Cased Below G.S.: 8'

Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall

Interval Perforated or Screened Below G.S.: N/A

Target Aquifer: Vadose

Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled the following intervals: 1-2' (1 3/8"); 6-7' (1 1/4"); installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2.25'	Tailings; brown to light brown; primarily sand; v.f.g.; moderately well sorted; slightly silty; wood frags. common; oxidized throughout.
2.25'	6'	Clay; black to dark brown; silty; blocky; root frags. throughout; occasional glass shards; occasional pyrite; root canals are oxidized; slightly moist at 5-6 feet.
6'	10'	Clay; similar to above becoming saturated at 7.5 feet; becoming dark green at 7 feet.
10'	10.5'	Sand; dark green; silty; fine grained; poorly sorted; subrounded; scattered pyrite; root frags. common.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-17

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: adjacent to BN tracks, Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 10' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled the following intervals: 4-5' (1 3/4"); 1-2' (1 1/2"); installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2'	Tailings; varicolored-rust to gray-brown; primarily sand; fine-grained; mod. well sorted; pyrite evident throughout; slight mottling at 1-2 feet.
2'	4'	Clay; dark gray to black; silty; numerous root frags.; slightly mottled at 2-2.25 feet; slightly moist; blocky; becomes more gray with depth.
4'	8'	Clay; dark green; blocky; some slickensides evident; saturated at 7.5 feet; occasional qtz. sand at 7-8 feet; pyrite throughout; glass shards at 7-8 feet.
8'	8.5'	Sand; dark green; clayey; very fine grained; well sorted; pyritic.
8.5'	10'	Clay; dark green; silty; root frags. throughout; glass shards common; sandier with depth.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-18

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: east of NP-14; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 10' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8.5' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation: MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled the following intervals: 1-2' (1 3/8"); 3-4' (1 3/4"); 7-8' (2"); installed neutron probe access tubes.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1.75'	Tailings; rust to brown; primarily fine grained sand; highly oxidized.
1.75'	2.5'	Clay; dark brown; silty; abundant root frags.; slightly mottled with oxidized material.
2.5'	3.5'	Silt; rust to dark brown; sandy; root frags throughout; pyrite common.
3.5'	8.5'	Sand; light brown to light gray; poorly sorted; v.f.g. to medium; subrounded; coarsens with depth; quartz, muscovite, biotite common; saturated at about 7 feet; becoming dark green and siltier 8-8.5 feet.
8.5'	10'	Clay; dark green; silty; numerous wood and root frags.; numerous glass shards.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-19

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: west of TS-01; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 10' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled the following intervals: 1-2' (1 7/8"); 2-3' (1 3/4"); 6-7' (1 3/4"); installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1'	Tailings; light brown to orange; primarily v.f.g sand; mod. well sorted; subrounded; dry.
1'	2'	Clay; dark gray to dark brown; silty; root frags.; blocky.
2'	3.5'	Silt; light to dark brown; slightly sandy; occasional pyrite; occasional root frags.
3.5'	5'	Clay; dark gray; silty; slightly moist; root frags. common; pyrite rich.
5'	5.5'	Sand; gray; fine-grained; mod. well sorted; subangular to angular; weakly cemented; dry.
5.5'	6.5'	Clay; black to dark green; silty; blocky; organic rich; pyrite rich; slightly moist.
6.5'	8.5'	Sand/gravel; gray, poorly sorted; med sand to med gravel; saturated at about 7.0 feet.

8.5'	9.5'	Silt; dark green to dark brown; clayey; occasional sandy lenses; pyrite rich; root frags.; grades coarser with depth.
9.5'	10'	Gravel; medium to large; sand matrix; mod. well rounded.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-20
Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: west of NP-19; Ramsay Flats
Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel
Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A
Total Depth Drilled: 10' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 7.5' Diameter and Type of Casing: 2 inch aluminum
Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:
Measuring Point Description/Elevation:
MP Height Above (+/-) or Below G.S.:
Well Annulus Completion Description:

Remarks: Sampled the following intervals: 0-1' (1 1/2"); 3-4' (1 1/4"); 5-6' (1 3/4"); installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	1'	Tailings; brown to rust; primarily silty sand; slightly moist.
1'	1.5'	Clay; black; slightly silty; organic rich; numerous root frags.
1.5'	6'	Silt; gray to brown; clayey; clay zone at 2.5 to 3 feet; pyrite rich; coarses with depth to pebble size at 5 to 6 feet; slightly moist at 6 feet.
6'	6.5'	Sand/gravel; varicolored; poorly sorted; fine grained to small gravel; saturated at 6.5 feet.
6.5'	7.75'	Clay; dark green; silty; root frags. common.
7.75'	10'	Gravel; poorly sorted; small to medium; subrounded; sand matrix; becoming sandier with silt matrix 8.5 to 10 feet.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-21

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: west of NP-20; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 8.5' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 8' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation: MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2.5'	Tailings; dark brown to rust; primarily silt; clayey with depth.
2.5'	5'	Clay; gray; blocky; occasional pyrite and root frags.
5'	3'	Sand; varicolored; poorly sorted; fine-grained to coarse; subangular to subrounded; occasional pyrite; saturated at about 6.5 feet; scattered gravel from 7 to 8 feet.
8'	8.5'	Gravel; small to medium; poorly sorted; subrounded; sand matrix; shelby tube refusal.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-21A

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: west of NP-21 in veg. area; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 6' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 6' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	0.1'	Tailings; orange to brown; sandy, thin veneer.
0.1'	2'	Silt; brown; clayey; abundant root system.
2'	4.5'	Clay; black to gray; blocky; abundant roots.
4.5'	6'	Sand; gray; poorly sorted; medium to coarse; saturated at 5.5 feet.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-22

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: west of NP-09 approx. 60 meters; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 8' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 7.5' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?		x
E-Logs?		x

Method Perforated or Screened

- ____ No casing in hole.
- ____ Open bottom only.
- ____ Slotted with Mill's Knife.
- ____ Slotted with a torch.
- ____ Screened by pulling casing.
- ____ Saw cut.
- x Other (specify) sealed bottom

Static Water Level: ____ Date: ____

Measuring Point Description/Elevation: ____ MP Height Above (+/-) or Below G.S.: ____

Well Annulus Completion Description: ____

Remarks: Installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2'	Tailings; sand; lt. gray to lt. brown; silty; clayey with depth; rust colored mottling throughout; abundant root system at 1.5 to 2 feet; fine-grained clean sandy lens at 1 foot (approximately 2 inches thick).
2'	6'	Clay; black to dark brown; silty; sandy with depth; slickensilides at 2 to 3 feet; root frags. scattered throughgout; scattered pyrite; slightly siltier and mottled at 4 to 6 feet.
6'	8'	Sand; dark green; poorly sorted; medium sand to small gravel; subrounded; saturated at 6 feet; primarily composed of quartz; scattered pyrite.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-23

Legal Location: T 3N R 9W Sec 22 Tract AA Descriptive Location: west of NP-22; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings Drilling Fluids Used: None Pilot Hole Diameter: 2 inch Reamed Hole Diameter: N/A

Total Depth Drilled: 8' Total Depth Reamed: N/A Total Depth Cased Below G.S.: 7.8' Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall Interval Perforated or Screened Below G.S.: N/A Target Aquifer: Vadose Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation: MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled the following intervals: 1-2' (2 1/4"); 3-4' (1 3/4"); 6-7' (1 1/2"); installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2'	Tailings; rust to gray to brown; primarily sand; very fine to fine grained; silty; root frags. at 1 to 2 feet.
2'	4'	Clay; dark gray; silty; significant root zone at 2.5 feet; root frags. throughout; scattered pyrite; slight mottling throughout.
4'	5'	Sand; light brown; fine grained; mod. well sorted; subangular; some oxidized mottling.
5'	6.5'	Clay; black to dark green; silty; pyrite rich; scattered root frags.; root canals are oxidized.
6.5'	8'	Sand; gray; fine-grained to coarse to small gravel; poorly sorted; subrounded; saturated at about 6.5 feet.

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MONITORING WELL LOG

State: Montana County: Silver Bow Project: SBC CERCLA Hole Name or Number: NP-24

Legal Location: T 3N R 9W Sec 22 Tract AA

Descriptive Location: west of NP-23; Ramsay Flats

Recorded by: Grotbo Date Hole Started: 05/14/85 Date Hole Completed: 05/14/85 Driller: D. Noel Drilling Company: Noel

Drill Method: Giddings

Drilling Fluids Used: None

Pilot Hole Diameter: 2 inch

Reamed Hole Diameter: N/A

Total Depth Drilled: 10'

Total Depth Reamed: N/A

Total Depth Cased Below G.S.: 7.9'

Diameter and Type of Casing: 2 inch aluminum

Weight or Gage of Casing: thin wall

Interval Perforated or Screened Below G.S.: N/A

Target Aquifer: Vadose

Packer Type and Depth Below G.S.: N/A

	YES	NO
Well Developed?		x
Well Test Pumped?		x
Water Samples Taken?		x
Material Samples Taken?	x	
E-Logs?		x

Method Perforated or Screened

	No casing in hole.
	Open bottom only.
	Slotted with Mill's Knife.
	Slotted with a torch.
	Screened by pulling casing.
	Saw cut.
x	Other (specify) sealed bottom

Static Water Level: Date:

Measuring Point Description/Elevation:

MP Height Above (+/-) or Below G.S.:

Well Annulus Completion Description:

Remarks: Sampled the following intervals: 0-1' (1 3/8"); 3-4' (1 1/2"); 4-5' (2"); installed neutron probe access tube.

DRILLING AND LITHOLOGIC LOG

From	To	Geological, Drilling, and Water Conditions and Sampling
0'	2'	Tailings; rust to light brown; primarily sand; fine grained; silty; slightly clayey at 0.5-1.5 feet; mottled at 1 to 2 feet.
2'	3.25'	Clay; black to dark gray; silty; glass shards scattered throughout.
3.25'	10'	Sand; light brown; poorly sorted; fine to medium size; subangular to subrounded; numerous roots at 3.25 to 3.5 feet; upper portion is dry; no cohesive matrix; coarsens with depth to small gravel size at 7-8 feet; saturated at about 7 feet.

DRAFT

ATTACHMENT III-E
SILVER BOW CREEK SOIL SAMPLING
SITE DESCRIPTIONS AND PEDFORM CODES

Record#	SITENUM	LOC1
1	1	NORTH SIDE OF SBC 300 FEET WEST OF BRIDGE
2	2	EAST OF ROCKER AND SOUTH OF EAST END OF SMELTER SITE.
3	3	1/2 MILE WEST OF ROCKER, S. SIDE OF SBC IN GULLY.
4	4	SOUTH OF RADIO TOWER IN NISSLER, NORTH OF CREEK NEXT TO SBC
5	5	1/4 MILE EAST OF SILVER BOW SOUTH SIDE OF CREEK.
6	6	200 FEET EAST OF LARGE DISCHARGE TO SBC 1/2 MI. W. SILV. BOW
7	7	NE OF STAUFFER NORTH OF SBC 40 FEET FROM STREAM.
8	8	SOUTH OF RAMSEY SCHOOL
9	9	90 FEET EAST OF BROWNS GULCH, 800 FEET NORTH OF SBC
10	10	ALONG BROWNS GULCH NEAR SAMPLE T9.
11	11	SOUTH OF KONDA FIELD IN TAILINGS ALONG SBC
12	12	ABOVE OLD DITCH E. OF LAGOON AT PETERSONS
13	13	BELOW OLD DITCH, EAST OF PETERSON LAGOON.
14	14	PETERSON ALFALFA FIELD BELOW YELLOW DITCH LATERAL
15	15	PETERSON OAT FIELD-SWALE BELOW YELLOW DITCH
16	16	LOWER PETERSON ALFALFA FIELD
17	17	PETERSON FIELD ABOVE LATERAL FROM YELLOW DITCH
18	18	LOCATED IN SBC FLOODPLAIN PAIRED WITH T19
19	19	120 FEET NNW OF CLARKS FORK FORAGE PLOTS, SPANGLER PROPERTY
20	20	SPANGLER PASTURE NORTH OF I-90
21	21	SPANGLER PASTURE NORTH OF I-90, WEST OF SMELTER, BELOW RAIL-
22	22	FORESEN PASTURE IN SLICKEN ALONG CLARK FORK
23	23	FORESEN PASTURE ADJACENT TO CLARK FORK
24	25	RAMSAY FLAT WEST LYSIMETER INSTALLATION
25	26	WHITE SALT CRUST SAMPLED AT SILVER BOW WELL LOCATION
26	27	SILVER BOW SELL LOCATION
27	28	RAMSAY FLAT EAST LYSIMETER INSTALLATION
28	29	WARM SPRINGS FISHING ACCESS ON POINT BAR
29	51	NW CORNER OF KONDA PASTURE
30	52	NW CORNER OF KONDA PASTURE
31	53	SW END OF KONDA FIELD ALONG RAILROAD TRACKS
32	54	ABOVE RAILROAD TRESTLE AT SPANGLERS NEAR SITE A7
33	55	SPANGLER NORTH PASTURE NEAR RR. TRESTLE N OF I-90
34	56	DUTTON RANCH NEAR GOLD CREEK
35	57	THURMOND UPPER PASTURE
36	58	THURMOND LOWER PASTURE 30 FEET EAST OF SBC.
37	59	FORESON PASTURE ABOVE TRACE OF EAST VALITON DITCH
38	60	FORESON PASTURE BELOW TRACE OF EAST VALITON DITCH

Record#	SITENUM	LOC2
1	1	NW 1/4, SW 1/4, SECTION 22, T3N, R8W
2	2	SW 1/4, NE 1/4, NE 1/4, SECTION 22, T3N, R8W
3	3	NW 1/4, NE 1/4, NE 1/4, SECTION 20, T3N, R8W
4	4	NE 1/4, NE 1/4, NE 1/4, NE 1/4, SECTION 19, T3N, R8W
5	5	SW 1/4, SE 1/4, SE 1/4, SECTION 13, T3N, R9W
6	6	SW 1/4, SW 1/4, SW 1/4, SECTION 13, T3N, R9W
7	7	NE 1/4, NE 1/4, NE 1/4, SECTION 23, T3N, R9W
8	8	NE 1/4, SW 1/4, NW 1/4, SECTION 23, T3N, R9W
9	9	NW 1/4, NE 1/4, NE 1/4, SECTION 22, T3N, R9W
10	10	NE 1/4, NW 1/4, NE 1/4, SECTION 22, T3N, R9W
11	11	SW 1/4, SW 1/4, SW 1/4, NW 1/4, SECTION 16, T3N, R9W
12	12	SW 1/4, SE 1/4, SE 1/4, SE 1/4, SECTION 35, T4N, R10W
13	13	SE 1/4, SE 1/4, SE 1/4, SE 1/4, SECTION 35, T4N, R10W
14	14	SW 1/4, NE 1/4, SE 1/4, NW 1/4, SECTION 35, T4N, R10W
15	15	SE 1/4, NE 1/4, SE 1/4, NW 1/4, SECTION 35, T4N, R10W
16	16	NE 1/4, NW 1/4, NW 1/4, NE 1/4, SECTION 35, T4N, R10W
17	17	SW 1/4, NW 1/4, NW 1/4, NE 1/4, SECTION 35, T4N, R10W
18	18	NE 1/4, NW 1/4, NW 1/4, SECTION 25, T4N, R10W
19	19	NE 1/4, NE 1/4, NE 1/4, SECTION 26, T4N, R10W
20	20	NE 1/4, SW 1/4, SW 1/4, SECTION 19, T4N, R9W
21	21	ROAD TRESTLE. SW 1/4, SW 1/4, SW 1/4, SECT. 19, T4N, R9W
22	22	NW 1/4, NW 1/4, SW 1/4, SECTION 16, T7N, R9W
23	23	SE 1/4, SW 1/4, NE 1/4, SECTION 16, T7N, R9W
24	25	NE 1/4, NE 1/4, NE 1/4, SECTION 22, T3N, R9W
25	26	SE 1/4, SE 1/4, SW 1/4, SECTION 13, T3N, R9W
26	27	SE 1/4, SE 1/4, SW 1/4, SECTION 13, T3N, R9W
27	28	NE 1/4, NE 1/4, NE 1/4, SECTION 22, T3N, R9W
28	29	SE 1/4, NW 1/4, SE 1/4, SECTION 18, T5N, R9W
29	51	SW 1/4,NW 1/4, SW 1/4, NW 1/4 SECTION 16, T5N R9W
30	52	SW 1/4, NW 1/4, SW 1/4, NW 1/4 SECTION 16 T3N R9W
31	53	SE 1/4, SW 1/4, SW 1/4, NW 1/4 SECTION 16 T3N R9W
32	54	SE 1/4, NE 1/4, NW 1/4 SECTION 30, T4N, R9W
33	55	NE 1/4, SW 1/4, NW 1/4 SECTION 30, T4N, R9W
34	56	NE 1/4, SW 1/4, NW 1/4, NE 1/4 SECTION 31 T10N R10W
35	57	SE 1/4, NE 1/4, SE 1/4, NW 1/4 SECTION 20 T3N R8W
36	58	NW 1/4, SW 1/4, NE 1/4, NW 1/4 SECTION 20 T3N R8W
37	59	NE 1/4, NE 1/4, SE 1/4 SECTION 16, T7N, R9W
38	60	NE 1/4, NE 1/4, SE 1/4 SECTION 16, T7N, R9W

Table 1. Index for parent material, vegetation, and land use codes in the PEDFORM system.

Code	Parent Material	Code	Vegetation	Code	Land Use
01	volcanic ash	01	mixed coniferous	01	commercial forest
02	loess	02	ponderosa pine	02	non-comm. forest
03	glacial outwash	03	lodgepole pine	03	forest
04	glacial till	04	spruce-fir	04	range
05	lacustrine	05	larch-fir	05	dryland crop
06	peat	06	Douglas-fir	06	irrigated crop
07	muck	07	mixed deciduous	07	irrigated hay
08	residual sandst.	08	cottonwood	08	dryland hay
09	residual shale	09	aspen	09	pasture
10	residual siltst.	10	trees	10	residential
11	residual limest.	11	dryland crop	11	urban
12	resid. crystalline	12	irrig. field crop	12	disturbed land
13	mixed alluvium	13	row crops	13	strip mine
14	alluvial	14	horticultural crop	14	mill tailings
15	colluvial	15	riparian	15	mine dump
16	soliflucate	16	mixed shortgrass	16	wildland
17	sandst. alluvium	17	mixed midgrass	17	landfill
18	shale alluvium	18	shrubs & grasses		
19	siltst. alluvium	19	halophytic		
20	crystalline alluv.	20	sedges & rushes		
21	limestone alluv.	21	perennial forage		
		22	tame pasture		

Table 2. Index for codes for drainage, permeability, erosion, landscape, position, and landform type in the PEDFORM system.

Code	Drainage	Code	Permeabililty	Code	Erosion
01	very poor	01	very slow	01	none
02	poor	02	slow	02	slight
03	poor to moderate	03	slow to medium	03	moderate
04	moderate	04	medium	04	severe
05	well	05	medium to rapid	05	slight-wind
06	well to excessive	06	rapid	06	moderate-wind
07	excessive	07	very rapid	07	severe-wind
08	altered, drained				
09	altered, wetted				

Table 3. Index for landscape position and landform codes in the PEDFORM SYSTEM.

Code	Landscape Position	Code	Landform
01	crest	01	sedimentary upland
02	ridge	02	mountains
03	upper midslope	03	playa
04	midslope	04	alluvial fan
05	lower midslope	05	sand dune
06	footslope	06	glacial outwash
07	level slope	07	ground morraine
		08	alpine till
		09	terrace
		10	floodplain
		11	plateau
		12	solifluction lobe
		13	patterned ground
		14	backswamp
		15	landslide
		16	badlands
		17	disturbed land
		18	talus

Table 4. Index for texture codes in the PEDFORM system.

Code	Symbol	Texture	Code	Symbol	Texture
--- USDA TEXTURE ---			--- FAMILY TEXTURE ---		
01	s	sand	20	sndy	sandy
02	ls	loamy sand	21	colo	coarse loamy
03	lfs	loamy fine sand	22	cosi	coarse silty
04	lvfs	loamy very fine s.	23	filo	fine loamy
05	sl	sandy loam	24	fisi	fine silty
06	fsl	fine sandy loam	25	fine	fine
07	vfsl	v. fine sandy loam	26	vf	very fine
08	l	loam	27	sskl	sandy skeletal
09	sil	silt loam	28	lskl	loamy skeletal
10	scl	sandy clay loam	29	cskl	clayey skeletal
11	cl	clay loam	30	frag	fragmental
12	sicl	silty clay loam	31	ashy	ashy
13	sc	sandy clay	32	mdl	medial
14	c	clay			
15	sic	silty clay			
16	cos	coarse sand			
17	fs	fine sand			
18	vfs	very fine sand			
19	si	silt			

Table 5. Index for structure grade, size, and kind used in the PEDFORM system.

Code	Structure grade
01	massive
02	weak:peds barely obsevable in place and when disturbed peds remain
03	weak to moderate
04	moderate: peds easily observable and when disturbed most of material consists of peds.
05	moderate to strong
06	strong: peds distinnctly visible, when disturbed entire soil mass is aggregated

Code	Structure kind
01	massive
02	platy
03	granular
04	subangular blocky
05	angular blocky
06	prismatic
07	columnar
08	wedge

Code	Size Class	Diameter of granules (mm)	Thickness of plates (mm)	Diameter of blocks (mm)	Diameter of prisms (mm)
01	very fine	<1	<1	<5	<10
02	fine	1-2	1-2	5-10	10-20
03	medium	2-5	2-5	10-20	20-50
04	coarse	5-10	5-10	20-50	50-100
05	very coarse	>10	>10	>50	>100

Table 6. Index for soil consistence in the PEDFORM system.

Code	Dry consistence	Code	Moist consistence
01	loose	01	loose
02	soft: easily crushes to powder	02	very friable: crushes under gentle pressure
03	slightly hard: easily broken between thumb and finger	03	friable: crushes easily under moderate pressure between"THUMB and finger
04	hard:easily broken in hand	04	firm: crushes under moderate pressure between thumb and finger
05	very hard: broken in hands with difficulty	05	very firm: barely crushable between thumb and finger
06	extremely hard: cannot be broken in hands	06	extremely firm: crushes under strong pressure in hand
07	indurated	07	indurated

Code	Wet stickiness	Code	Wet plasticity
01	nonsticky: no adherence	01	nonplastic: no wire formed
02	slightly sticky: adheres to thumb and finger but comes off one cleanly	02	slightly plastic: wire forms but easily deformed
03	sticky: soil adheres and stretches before pulling apart	03	plastic: wire forms, moderate pressure required to deform
04	very sticky: soil adheres to both fingers	04	very plastic: wire forms, much pressure required to deform

Table 7. Index for root abundance, size, and location in the PEDFORM system.

Code	Size
01	none
02	very fine (0.1-1mm)
03	fine and very fine
04	fine (1-2mm)
05	medium and fine
06	medium (2-5mm)
07	coarse and medium
08	coarse (>5mm)
09	fine and coarse

Code	Location
01	none
02	throughout horizon
03	between peds
04	flattened in cracks
05	flattened around rocks
06	mat at top of horizon

Code	Abundance CLASS	Very fine (NUMBER/DM**2)	Fine (NUMBER/DM**2)	Medium (NUMBER/DM**2)	Coarse (NUMBER/DM**2)
01	none				
02	trace				
03	few	<10	<10	<1	<1"
04	few to common				
05	common	10-100	10-100	1-10	1-5"
06	common to many				
07	many	>100	>100	>10	>5"

Table 8. Index for pore abundance, size, and kind in the PEDFORM system.

Code	Size	Code	Kind
01	none	01	none
02	micro and very fine	02	irregular and tubular
03	very fine (.1-.5mm)	03	tubular
04	fine and very fine	04	tubular continuous
05	fine (.5-2mm)	05	tubular discontinuous
06	medium and fine	06	vesicular
07	medium (2-5mm)	07	vesicular and tubular
08	coarse and medium	08	interstitial voids between peds
09	coarse (>5mm)	09	interstitial voids between rocks

CODE	ABUNDANCE CLASS	VERY FINE	FINE	MEDIUM	COARSE
		----- (NUMBER/DM**2) -------			
01	none				
02	trace				
03	few	<10	<10	<1	<1"
04	few to common				
05	common	10-100	10-100	1-10	1-5"
06	common to many				
07	many	>100	>100	>10	>5

Table 9. Index for effervescence in HCl, and horizon boundary in the PEDFORM system.

Code	Effervescence	Lower Horizon Boundary Code	Distinctness	Code	Shape
01	noncalcareous	01	abrupt <1in.)	01	smooth
02	slight	02	clear (1-2.5in.)	02	wavy
03	moderate	03	gradual (2.5-5in.)	03	irregular
04	violent	04	diffuse (>5in.)	04	broken
		05	arbitrary	05	arbitrary
		06	not reached	06	not reached

Table 10. Index for county codes in the PEDFORM system.

Code	County	Code	County	Code	County
01	Silver Bow	19	Chouteau	37	Daniels
02	Cascade	20	Valley	38	Glacier
03	Yellowstone	21	Toole	39	Fallon
04	Missoula	22	Big Horn	40	Sweet Grass
05	Lewis & Clark	23	Musselshell	41	McCone
06	Gallatin	24	Blaine	42	Carter
07	Flathead	25	Madison	43	Broadwater
08	Fergus	26	Pondera	44	Wheatland
09	Powder River	27	Richland	45	Prairie
10	Carbon	28	Powell	46	Granite
11	Phillips	29	Rosebud	47	Meagher
12	Hill	30	Deer Lodge	48	Liberty
13	Ravalli	31	Teton	49	Park
14	Custer	32	Stillwater	50	Garfield
15	Lake	33	Treasure	51	Jefferson
16	Dawson	34	Sheridan	52	Wibaux
17	Roosevelt	35	Sanders	53	Golden Valley
18	Beaverhead	36	Judith Basin	54	Mineral
				55	Petroleum
				56	Lincoln

SITE DESCRIPTION

SOIL SERIES: T1 SITE NUMBER: 1 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : NORTH SIDE OF SBC 300 FEET WEST OF BRIDGE
NW 1/4, SW 1/4, SECTION 22, T3N, R8W

DATE : 11/15/85 1200 ELEVATION : 5400F 1645M PRECIP : 11.8 IN 299.7MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : somewhat poor PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :disturbed landNUM.HOR.: 5
SLOPE : 1% 0.6 D ASPECT :S

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
C1	1	0- 15	7.5YR5/8	7.5YR6/8	vfsl	0	111	2211	111	111	0.0	1	21
C2	2	15- 19	2.5Y 5/8	2.5Y 7/8	s	50	662	7511	111	111	0.0	1	31
C3	3	19- 26	10YR 3/1	10YR 5/1	sl	0	111	3211	111	111	0.0	1	12
IIO1b	4	26- 31	10YR 2/1	10YR 3/1	histc	0	254	3311	111	111	0.0	1	31
IIA1b	5	31- 34	10YR 3/1	10YR 5/1	sil	0	111	3323	111	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
TAILINGS 66 CM DEEP, WATER AT 74 CM. BUNCHGRASS ALONG MARGIN OF SBC, ELSEWHERE BARE GROUND.

HORIZON:
C1: STRATIFICATIONS OF 10YR 3/2 1 INCH THICK
C2: IRON-CEMENTED LAYER
C3: REDUCED LAYER
IIO1b: BURIED HISTIC HORIZON
IIA1b: ORIGINAL MINERAL SOIL

SITE DESCRIPTION

SOIL SERIES: T2 SITE NUMBER: 2 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : EAST OF ROCKER AND SOUTH OF EAST END OF SMELTER SITE.
SW 1/4, NE 1/4, NE 1/4, SECTION 22, T3N, R8W

DATE : 11/15/85 1430 ELEVATION : 5390F 1642M PRECIP : 11.8 IN 299.7MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : somewhat poor PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :disturbed landNUM.HOR.: 5
SLOPE : 1% 0.6 D ASPECT :S

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
C1	6	0- 4	10YR 5/6	10YR 7/6	ls	10	111	2211	111	111	0.0	1	21
C2	7	4- 14	10YR 3/4	10YR 5/4	sl	10	111	2211	111	111	0.0	1	11
C3	8	14- 27	2.5Y 5/6	2.5Y 6/6	ls	0	662	7411	111	111	0.0	1	31
C4	9	27- 43	10YR 3/2	10YR 5/2	fsl	0	111	2211	111	111	0.0	1	12
IIA1b	10	43- 51	10YR 3/1	10YR 4/1	sl	0	111	3312	542	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
15 FEET NORTH OF CREEK, TAILINGS 106 CM DEEP, WATER TABLE AT 96 CM.
HORIZON:

C3: OXIDIZED INDURATED LAYER
C4: REDUCED ZONE
IIA1b: BURIED A HORIZON

SITE DESCRIPTION

SOIL SERIES: T3 SITE NUMBER: 3 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : 1/2 MILE WEST OF ROCKER, S. SIDE OF SBC IN GULLY.
NW 1/4, NE 1/4, NE 1/4, SECTION 20, T3N, R8W

DATE : 11/16/85 1030 ELEVATION : 5375F 1638M PRECIP : 11.7 IN 297.2MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : somewhat poor PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :disturbed landNUM.HOR.: 6
SLOPE : 1% 0.6 D ASPECT :N

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
C1	11	0- 8	10YR 5/8	10YR 6/8	sil	0	344	4323	111	111	0.0	1	21
C2	12	8- 22	10YR 5/8	10YR 6/8	ls	25	662	7511	111	111	0.0	1	31
C3	13	22- 35	10YR 4/3	10YR 6/3	sl	5	111	2211	342	111	0.0	1	31
C4	14	35- 46	10YR 4/1	10YR 6/1	sil	0	111	3323	552	111	0.0	1	22
IIA1b	15	46- 59	10YR 3/1	10YR 5/1	sil	0	111	3322	752	111	0.0	1	21
IIB2b	16	59- 68	10YR 3/2	10YR 5/2	s	0	111	1111	111	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
TAILINGS 116 CM DEEP, WATER AT 152 CM, 6 FEET SOUTH OF CREEK
STREAM BELOW OLD SURFACE.
HORIZON:
C1: STRATIFICATION OF 5Y 7/1 SILTY CALY LOAM
C2: IRON-CEMENTED LAYER

C4: REDUCED LAYER
IIA1b: OLD BURIED MUCK LAYER

SITE DESCRIPTION

SOIL SERIES: T4 SITE NUMBER: 4 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : SOUTH OF RADIO TOWER IN NISSLER, NORTH OF CREEK NEXT TO SBC
NE 1/4, NE 1/4, NE 1/4, NE 1/4, SECTION 19, T3N, R8W

DATE : 11/16/84 1400 ELEVATION : 5365F 1635M PRECIP : 11.7 IN 297.2MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : poor PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 4
SLOPE : 1% 0.6 D ASPECT :S

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS asl	RT ask	PR pH	EFF	BND
C1	17	0- 5	2.5Y 6/6	2.5Y 7/6	ls	0	111	1111	111	111	0.0	1	21
C2	18	5- 8	10YR 5/1	10YR 6/1	sil	0	342	3322	111	111	0.0	1	21
C3	19	8- 24	10YR 5/8	10YR 6/8	s	20	252	1111	111	111	0.0	1	31
C4	20	24- 32	10YR 3/2	10YR 5/2	s	20	111	1111	111	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
TAILINGS 80 CM DEEP, WATER TABLE AT 64 CM. VEGETAED ALONG
BANK OF STREAM.
HORIZON:

C2: REDUCED LAYER
C3: STRATIFICATIONS OF HIGH CHROMA (OXIDIZED) MATERIAL
C4: REDUCED LAYER, ABUNDANT COARSE SAND

SITE DESCRIPTION

SOIL SERIES: T5 SITE NUMBER: 5 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : 1/4 MILE EAST OF SILVER BOW SOUTH SIDE OF CREEK.
SW 1/4, SE 1/4, SE 1/4, SECTION 13, T3N, R9W

DATE : 11/16/85 1630 ELEVATION : 5345F 1629M PRECIP : 11.6 IN 294.6MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : somewhat poor PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 5
SLOPE : 1% 0.6 D ASPECT :N

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS asl	RT ask	PR pH	EFF	BND
C1	21	0- 10	2.5Y 6/4	2.5Y 7/4	sil	0	432	3322	111	111	0.0	1	21
C2	22	10- 24	2.5Y 4/4	2/5Y 5/4	sil	0	111	3322	111	111	0.0	1	31
C3	23	24- 39	10YR 3/1	10YR 5/1	sil	0	111	3322	576	111	0.0	1	21
C4	24	39- 52	10YR 4/2	10YR 6/2	sicl	0	111	4323	111	111	0.0	1	12
IIA1b	25	52- 87	10YR 2/1	10YR 3/1	sil	0	452	4323	552	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
TAILINGS 132 CM DEEP, WATER TABLE AT 220 CM, BARE GROUND

HORIZON:
C1: THIN (1-2MM) STRATIFICATIONS OF FINE SAND
C2: FINE SAND STRATIFICATIONS
C3: PYRITE FLAKES BELOW 61 CM.
C4: MOTTLES OF 2.5Y 4/6
IIA1b: ORIGINAL SOIL SURFACE, MOTTLED.

SITE DESCRIPTION

SOIL SERIES: T6 SITE NUMBER: 6 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : 200 FEET EAST OF LARGE DISCHARGE TO SBC 1/2 MI. W. SILV. BOW
SW 1/4, SW 1/4, SW 1/4, SECTION 13, T3N, R9W

DATE : 11/17/85 1040 ELEVATION : 5335F 1626M PRECIP : 11.6 IN 294.6MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : somewhat poor PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 6
SLOPE : 1% 0.6 D ASPECT :S

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	STR asl	CONS ask	pH	RT EFF	PR BND
C1	26	0- 4	10YR 4/3	10YR 6/4	fsl	0	111	2211	111	111	0.0	1	21
C2	27	4- 13	10YR 5/2	10YR 6/2	vfsl	0	111	2111	111	111	0.0	1	21
C3(1)	28	13- 34	10YR 4/6	10YR 6/6	sil	0	111	3322	111	111	0.0	1	12
C3(2)	29	13- 34	10YR 3/3	10YR 5/3	sil	0	111	3322	111	111	0.0	1	12
IIA1B	30	34- 42	10YR 3/1	10YR 4/1	sil	0	352	4323	562	111	0.0	1	31
IIB2	31	42- 79	10YR 4/1	10YR 6/1	fsl	0	111	2211	542	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
SAMPLE 32: SURFACE SALTS ON STREAMBANK, PEDON 30 FT. TO SBC
TAILINGS DEPTH 86 CM, WATER TABLE 205 CM
HORIZON:

C2: STRATIFICATIONS OF 10YR 4/6 FINE SAND 1-2 IN. THICK
C3(1): OXIDIZED LAYER ONLY SAMPLED
C3(2): REDUCED LAYER ONLY SAMPLED
IIA1b: OLD SOIL SURFACE
IIB2: MOTTLED WITH 10YR 6/8

SITE DESCRIPTION

SOIL SERIES: T7 SITE NUMBER: 7 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : NE OF STAUFFER NORTH OF SBC 40 FEET FROM STREAM.
NE 1/4, NE 1/4, NE 1/4, SECTION 23, T3N, R9W

DATE : 11/17/84 1350 ELEVATION : 5325F 1623M PRECIP : 11.6 IN 294.6MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : somewhat poor PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 4
SLOPE : 1% 0.6 D ASPECT :S

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS asl	RT ask	PR pH	EFF	BND
C1	33	0- 12	10YR 4/6	10YR 6/6	s	0	111	1111	111	111	0.0	1	31
C2	34	12- 19	10YR 6/6	10YR 7/6	s	25	111	1111	111	111	0.0	1	31
IIA1b	35	19- 24	10YR 3/3	10YR 5/3	sil	15	352	3322	552	111	0.0	1	31
IIC1	36	24- 38	10YR 4/3	10YR 5/3	s	40	111	1111	542	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
TAILINGS 97 CM DEEP, WATER TABLE AT 250 CM.

HORIZON:

IIA1: ORIGINAL SOIL SURFACE

SITE DESCRIPTION

SOIL SERIES: T8 SITE NUMBER: 8 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : SOUTH OF RAMSEY SCHOOL
NE 1/4, SW 1/4, NW 1/4, SECTION 23, T3N, R9W

DATE : 11/17/84 1600 ELEVATION : 5310F 1618M PRECIP : 11.5 IN 292.1MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : somewhat poor PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 4
SLOPE : 1% 0.6 D ASPECT :S

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS asl	RT ask	PR pH	EFF	BND
C1	37	0- 14	10YR 7/2	10YR 8/2	lfs	0	111	2211	111	111	0.0	1	31
C2	38	14- 32	10YR 3/3	10YR 4/3	sil	0	452	4323	552	111	0.0	1	21
C3	39	32- 43	10YR 4/3	10YR 6/3	fsl	0	111	2211	111	111	0.0	1	12
IIC1	40	43- 61	10YR 4/2	10YR 6/2	fsl	0	111	3222	326	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
TAILINGS 108 CM DEEP, WATER TABLE AT 300 CM.

HORIZON:
C1: SOME SANDY STRATIFICATIONS OF 10YR 5/8

IIC1: 10YR 5/8 MOTTLES LOWER HORIZON, GRAY GRAVEL BELOW 61"

SITE DESCRIPTION

SOIL SERIES: T9 SITE NUMBER: 9 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : 90 FEET EAST OF BROWNS GULCH, 800 FEET NORTH OF SBC
NW 1/4, NE 1/4, NE 1/4, SECTION 22, T3N, R9W

DATE : 11/18/84 1350 ELEVATION : 5294F 1613M PRECIP : 11.4 IN 289.6MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : somewhat poor PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 7
SLOPE : 1% 0.6 D ASPECT :S

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS asl	RT ask	PR pH	EFF	BND
C1	41	0- 15	10YR 5/2	10YR 7/2	vfsl	0	111	2211	542	111	0.0	1	21
C2	42	15- 22	10YR 4/2	10YR 6/2	vfsl	0	111	2211	522	111	0.0	1	21
C4	44	32- 42	10YR 4/2	10YR 6/2	fsl	0	111	2211	322	111	0.0	1	31
IIA1b	45	42- 48	10YR 3/1	10YR 4/1	sil	0	452	3323	742	111	0.0	1	21
IIC1	46	48- 54	10YR 6/3	10YR 7/3	ls	0	111	1111	111	111	0.0	1	31
IIC2	47	54- 64	10YR 3/1	10YR 5/1		0	111	3323	322	111	0.0	1	66
C1	48	0- 10	10YR 5/4	10YR 6/4	sil	0	442	3323	742	111	0.0	1	31

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
TAILINGS 106 CM DEEP, WATER AT 173 CM.
COARSE SAND BELOW 162 CM (10YR 4/1).
HORIZON:
C1: STRATIFIED LAYERS 1 INCH THICK 10YR 5/8

IIA1b: ORIGINAL SOIL SURFACE
IIC1: IRON STAINS IN BAND AT TOP AND BOTTOM OF HORIZON
IIC2: IRON STAINING AROUND ROOT CASTS, REDUCED
C1: SOME MOTTLES

SITE DESCRIPTION

SOIL SERIES: T10 SITE NUMBER: 10 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : ALONG BROWNS GULCH NEAR SAMPLE T9.
NE 1/4, NW 1/4, NE 1/4, SECTION 22, T3N, R9W

DATE : 11/18/84 1540 ELEVATION : 5290F 1612M PRECIP : 11.4 IN 289.6MM
MATERIAL : tailings VEGETATION :peren. forage LAND USE:mill tailings
DRAINAGE : poor PERMEABILITY:mod. slow EROSION :moderate
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 4
SLOPE : 1% 0.6 D ASPECT :S

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
C1	48	0- 10	10YR 5/4	10YR 6/4	sil	0	442	3323	742	111	0.0	1	31
C2	49	10- 25	10YR 4/2	10YR 6/2	sil	0	111	3323	582	111	0.0	1	31
IIC1	50	26- 42	10YR 4/2	10YR 6/2	scl	0	111	4323	382	111	0.0	1	31
IIC2	51	42- 47	10YR 5/1	10YR 7/1	sl	0	111	1111	111	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
WELL VEGETATED SITE (REDTOP). SALTS AT SURFACE AT ADJACENT BARE SITE.
HORIZON:
C1: SOME MOTTLES
C2: BURIED A HORIZON AT 25 INCHES (NO SAMPLE)

SITE DESCRIPTION

SOIL SERIES: T11 SITE NUMBER: 11 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : SOUTH OF KONDA FIELD IN TAILINGS ALONG SBC
SW 1/4, SW 1/4, SW 1/4, NW 1/4, SECTION 16, T3N, R9W

DATE : 06/27/85 1750 ELEVATION : 5260F 1603M PRECIP : 11.3 IN 287.0MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : mod. well PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :disturbed landNUM.HOR.: 3
SLOPE : 1% 0.6 D ASPECT :W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS asl	CONS ask	RT pH	PR EFF	BND
C1	52	0- 25	10YR 6/8	10YR 7/8	lfs	0	111	2211	111	111	0.0	1	31
C2	53	25- 64	10YR 3/2	10YR 5/2	vfsl	0	111	2212	111	111	0.0	1	12
IIA1	54	64- 82	10YR 3/2	10YR 5/3	cos	30	111	1111	111	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
TAILINGS DEPTH VARIES FROM 2 TO 6 FEET, ERODED.
SALT DEPOSITS AT SURFACE
HORIZON:
C1: 7.5YR 4/8 LFS, 7.5YR 3/2 VFSL LAYERS 3 IN. THICK
C2: REDUCED, STRATIFICATIONS OF 7.5YR 4/8 AND 10YR 6/2
IIA1: GRAVELLY COARSE SAND ALLUVIUM

SITE DESCRIPTION

SOIL SERIES: T12 SITE NUMBER: 12 COUNTY : SILVER BOW
TAXON : CLAYEY OVER SANDY, MIXED ARIDIC ARGIBOROLLS (129A)
LOCATION : ABOVE OLD DITCH E. OF LAGOON AT PETERSONS
SW 1/4, SE 1/4, SE 1/4, SE 1/4, SECTION 35, T4N, R10W

DATE : 06/28/85 1240 ELEVATION : 5100F 1554M PRECIP : 11.1 IN 281.9MM
MATERIAL : res. igneous VEGETATION :sedge & rush LAND USE:pasture
DRAINAGE : somewhat poor PERMEABILITY:slow EROSION :none
POSITION : footslope LANDFORM :terrace NUM.HOR.: 2
SLOPE : 1% 0.6 D ASPECT :N

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
O1	59	0- 5	10YR 3/1	10YR 4/1	fibrc	0	111	3311	772	111	0.0	1	21
IIC1	60	5- 17	10YR 4/1	10YR 5/1	ls	0	111	1111	361	111	0.0	1	13

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
5 INCH HISTIC HORIZON OVER SANDS AND OLD ARGILLIC HORIZON ON FLOODPLAIN OF SBC

HORIZON:
O1: HISTIC HORIZON
IIC1: COARSE AND MEDIUM SAND OVER ERODED ARGILLIC HORIZON

SITE DESCRIPTION

SOIL SERIES: T13 SITE NUMBER: 13 COUNTY : SILVER BOW
TAXON : CLAYEY OVER SANDY, MIXED ARIDIC ARGIBOROLLS (129A)
LOCATION : BELOW OLD DITCH, EAST OF PETERSON LAGOON.
SE 1/4, SE 1/4, SE 1/4, SE 1/4, SECTION 35, T4N, R10W

DATE : 06/29/85 1315 ELEVATION : 5100F 1554M PRECIP : 11.1 IN 281.9MM
MATERIAL : crystl. alluv. VEGETATION :bare ground LAND USE:pasture
DRAINAGE : poor PERMEABILITY:moderate EROSION :severe
POSITION : footslope LANDFORM :terrace NUM.HOR.: 3
SLOPE : 1% 0.6 D ASPECT :N

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS RT asl	CONS RT ask	PR pH	PR EFF	PR BND
C1	61	0- 3	10YR 3/3	10YR 5/3	sil	0	464	4323	111	346	5.5	1	12
IIO1	62	3- 10	10YR 2/2	10YR 4/2	1	5	111	3212	342	544	5.5	1	21
IIB2	63	10- 18	10YR 3/3	10YR 5/3	sl	40	111	3212	111	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
TERRACE ABOVE SBC, 2 INCHES CONTAMINATED SEDIMENT FROM IRRIGATION, BARE GROUND WITH SOME CAREX

HORIZON:
C1: LAYER OF SEDIMENT FROM IRRIGATION DITCH
IIO1: DECOMPOSED FIBRIC LAYER BURIED BY SEDIMENT
IIB2: ABUNDANT SANDS AND GRAVEL

SITE DESCRIPTION

SOIL SERIES: ANACONDA - T14 SITE NUMBER: 14 COUNTY : DEER LODGE
TAXON : FINE-LOAMY, MIXED ARIDIC HAPLOBOROLLS (35D)
LOCATION : PETERSON ALFALFA FIELD BELOW YELLOW DITCH LATERAL
SW 1/4, NE 1/4, SE 1/4, NW 1/4, SECTION 35, T4N, R10W

DATE : 06/28/85 1015 ELEVATION : 5080F 1548M PRECIP : 11.0 IN 279.4MM
MATERIAL : cryst1. alluv. VEGETATION :irr. fieldcrop LAND USE: irrigated hay
DRAINAGE : well PERMEABILITY: mod. rapid EROSION : severe
POSITION : footslope LANDFORM :alluvial fan NUM.HOR.: 1
SLOPE : 4% 2.3 D ASPECT :S 70DEG E

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	STR as1	CONS ask	RT	PR	pH	EFF	BND
A1	55	0- 4	10YR 3/2	10YR 5/2	s1	3	111	4312	572	111	5.5	1	55		

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
BARE GROUND ALONG LATERAL, GRAVEL VENEER ON SURFACE.
FAILURE IN FIRST YEAR STAND, EXISTING PLANTS NOT NODULATED
HORIZON:
A1: ABUNDANT COARSE SAND, ACID SPOTS ON SURFACE (NEAR DITCH)

SITE DESCRIPTION

SOIL SERIES: T15 SITE NUMBER: 15 COUNTY : DEER LODGE
TAXON : FINE-LOAMY, MIXED AQUIC HAPLOBOROLLS (535A)
LOCATION : PETERSON OAT FIELD-SWALE BELOW YELLOW DITCH
SE 1/4, NE 1/4, SE 1/4, NW 1/4, SECTION 35, T4N, R10W

DATE : 06/29/85 950 ELEVATION : 5080F 1548M PRECIP : 11.0 IN 279.4MM
MATERIAL : crystl. alluv. VEGETATION :irr. fieldcrop LAND USE:irrigated crop
DRAINAGE : somewhat poor PERMEABILITY:mod. slow EROSION :moderate
POSITION : footslope LANDFORM :alluvial fan NUM.HOR.: 1
SLOPE : 3% 1.8 D ASPECT :N 30DEG W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
A1	56	0- 8	10YR 3/2	10YR 4/2	cl	0	254	4333	542	111	8.0	2	11

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
CHLOROTIC OATS, STUNTED, WHITICH YELLOE TIPS WITH GREEN VEINS. AFFECTED PLANTS ALONG SWALE (CU DEFICIENT?)

HORIZON:
A1: UNDERLIEING B HORIZON CAMBIC, HIGH O.M. % (AQUIC)

SITE DESCRIPTION

SOIL SERIES: VARNEY - T16 SITE NUMBER: 16 COUNTY : DEER LODGE
TAXON : FINE-LOAMY, MIXED ARIDIC ARGIBOROLLS (36C)
LOCATION : LOWER PETERSON ALFALFA FIELD
NE 1/4, NW 1/4, NW 1/4, NE 1/4, SECTION 35, T4N, R10W

DATE : 06/28/85 1100 ELEVATION : 5040F 1536M PRECIP : 10.9 IN 276.9MM
MATERIAL : crystl. alluv. VEGETATION :irr. fieldcrop LAND USE:irrigated hay
DRAINAGE : well PERMEABILITY:moderate EROSION :moderate
POSITION : footslope LANDFORM :alluvial fan NUM.HOR.: 1
SLOPE : 2% 1.2 D ASPECT :NE

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR CONS RT PR gsk dmsp asl ask	pH	EFF	BND
A1	57	0- 5	10YR 3/3	10YR 5/4	sl	5	254 3311 222 111	0.0	1	21

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
BARE AREA ALONG YELLOW DITCH LATERAL. FIRST YEAR ALFALFA DIED OR DID NOT NODULATE. WEEDY.
HORIZON:
A1: MAY BE SOME SEDIMENT FROM DITCH

SITE DESCRIPTION

SOIL SERIES: VARNEY - T17 SITE NUMBER: 17 COUNTY : DEER LODGE
TAXON : FINE-LOAMY, MIXED ARIDIC ARGIBOROLLS (36C)
LOCATION : PETERSON FIELD ABOVE LATERAL FROM YELLOW DITCH
SW 1/4, NW 1/4, NW 1/4, NE 1/4, SECTION 35, T4N, R10W

DATE : 06/28/85 1110 ELEVATION : 5040F 1536M PRECIP : 10.9 IN 276.9MM
MATERIAL : crystl. alluv. VEGETATION :irr. fieldcrop LAND USE: irrigated hay
DRAINAGE : well PERMEABILITY: moderate EROSION : slight
POSITION : footslope LANDFORM :alluvial fan NUM.HOR.: 1
SLOPE : 3% 1.8 D ASPECT :NNE

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
A1	58	0- 5	10YR 4/3	10YR 6/4	scl	0	344	4323	752	111	0.0	1	11

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
LOCATED ABOVE DITCH IN GOOD ALFALFA STAND. SOIL 20 INCHES TO ROCK AND FINER TEXTURED THAN T16.
HORIZON:

SITE DESCRIPTION

SOIL SERIES: T18 SITE NUMBER: 18 COUNTY : DEER LODGE
TAXON : FINE-LOAMY, MIXED TYPIC FLUVAQUENTS (5A)
LOCATION : LOCATED IN SBC FLOODPLAIN PAIRED WITH T19
NE 1/4, NW 1/4, NW 1/4, SECTION 25, T4N, R10W

DATE : 07/06/85 1310 ELEVATION : 5000F 1524M PRECIP : 10.8 IN 274.3MM
MATERIAL : mixed alluviumVEGETATION :riparian LAND USE:disturbed land
DRAINAGE : well PERMEABILITY:mod. rapid EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 3
SLOPE : 1% 0.6 D ASPECT :N

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
C1	67	0- 7	10YR 4/6	10YR 5/6	sil	0	432	2212	542	746	0.0	1	12
IIA1	68	7- 15	10YR 2/2	10YR 4/2	l	0	442	2212	742	543	0.0	1	21
IIC1	69	15- 23	10YR 4/3	10YR 6/3	vfsl	0	111	2211	472	344	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
CONTAMINATED BY FLOOD DEPOSITION, SCATTERED DEAD WILLOW WITH BASIN WILDRYE, CAREX, AGSM, RIBES, ABUNDANT BARE GROUND.

HORIZON:
C1: MANY WOODY FRAGMENTS IN FLOOD-DEPOSITED TAILINGS
IIA1: ABUNDANT O.M. INDICATING ONCE SWAMPY CONDITIONS
IIC1: SORTED VFS FROM FLUVIAL DEPOSITION

SITE DESCRIPTION

SOIL SERIES: BEAVERELL - T19ITE NUMBER: 19 COUNTY : DEER LODGE
TAXON : LOAMY-SKELETAL, MIXED ARIDIC ARGIBOROLLS - COOL (132A)
LOCATION : 120 FEET NNW OF CLARKS FORK FORAGE PLOTS, SPANGLER PROPERTY
NE 1/4, NE 1/4, NE 1/4, SECTION 26, T4N, R10W

DATE : 07/06/85 1205 ELEVATION : 5000F 1524M PRECIP : 10.8 IN 274.3MM
MATERIAL : crystl. alluv. VEGETATION :bare ground LAND USE:pasture
DRAINAGE : somewhat exc. PERMEABILITY:mod. rapid EROSION :severe - wind
POSITION : level slope LANDFORM :terrace NUM.HOR.: 3
SLOPE : 1% 0.6 D ASPECT :NNW

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT as1	PR ask	pH	EFF	BND
A1	64	0- 6	10YR 3/3	10YR 6/3	ls	3	252	1111	362	546	4.2	1	33
B2t	65	6- 14	10YR 3/4	10YR 5/4	l	10	254	3323	742	554	5.5	1	21
C1	66	14- 26	10YR 4/4	10YR 5/4	l	65	111	3323	565	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
SHRUB PATCHES IN HUMMOCKS 6 TO 18" HIGH, GRAVEL AT 14". BARE GROUND (90%) WITH WEEDS, AGSM, ARTR. MANY IRRIG. DITCHES.

HORIZON:
A1: ABUNDANT COARSE SAND, INTERMITTENT B2T BELOW A1
B2t: DISCONTINUOUS DARK CUTANS ON PED SURFACES
C1: ARGILLIC EXTENDS INTO ALLUVIAL GRAVELS IN PLACES.

SITE DESCRIPTION

SOIL SERIES: TALLY(COOL) -T80TE NUMBER: 20 COUNTY : DEER LODGE
TAXON : COARSE-LOAMY, MIXED TYPIC HAPLOBOROLLS (135B)
LOCATION : SPANGLER PASTURE NORTH OF I-90
NE 1/4, SW 1/4, SW 1/4, SECTION 19, T4N, R9W

DATE : 07/06/85 1700 ELEVATION : 5085F 1549M PRECIP : 10.7 IN 271.8MM
MATERIAL : cryst1. alluv. VEGETATION :mixed midgrass LAND USE: range
DRAINAGE : well PERMEABILITY: rapid EROSION : severe - wind
POSITION : lower midslope LANDFORM :alluvial fan NUM.HOR.: 1
SLOPE : 6% 3.4 D ASPECT :W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	STR asl	CONS ask	RT pH	PR EFF	PR BND
C1	70	0- 6	10YR 3/3	10YR 5/4	ls	0	111	1111	342	546	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
BARE GROUND (40%) WITH BASIN WILDRYE, AGSM, ARTR.

HORIZON:
C1: MODERATELY CONTAMINATED BY SMELTER OR WIND DEPOSITION.

SITE DESCRIPTION

SOIL SERIES: TALLY(COOL) -T81TE NUMBER: 21 COUNTY : DEER LODGE
TAXON : COARSE-LOAMY, MIXED TYPIC HAPLOBOROLLS (135B)
LOCATION : SPANGLER PASTURE NORTH OF I-90, WEST OF SMELTER, BELOW RAIL-
ROAD TRESTLE. SW 1/4, SW 1/4, SW 1/4, SECT. 19, T4N, R9W

DATE : 07/06/85 1730 ELEVATION : 5075F 1546M PRECIP : 10.7 IN 271.8MM
MATERIAL : crystl. alluv. VEGETATION :bare ground LAND USE:pasture
DRAINAGE : well PERMEABILITY:rapid EROSION :severe - wind
POSITION : footslope LANDFORM :terrace NUM.HOR.: 1
SLOPE : 3% 1.8 D ASPECT :W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS asl	CONS ask	RT pH	PR EFF	PR BND
C1	71	0- 6	10YR 4/3	10YR 6/4	ls	0	111	1111	111	346	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
CONTAMINATED FROM IRRIGATION AND/OR SMELTER. EXCESSIVE WIND EROSION. SCATTERED BASIN WILDRYE, AGSM, LEAFY SPURGE.
HORIZON:

SITE DESCRIPTION

SOIL SERIES: T22 SITE NUMBER: 22 COUNTY : POWELL
TAXON : FINE-LOAMY, MIXED TYPIC FLUVAQUENTS (5A)
LOCATION : FORESEN PASTURE IN SLICKEN ALONG CLARK FORK
NW 1/4, NW 1/4, SW 1/4, SECTION 16, T7N, R9W

DATE : 07/07/85 1050 ELEVATION : 4530F 1380M PRECIP : 11.8 IN 299.7MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:pasture
DRAINAGE : mod. well PERMEABILITY:moderate EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 1
SLOPE : 1% 0.6 D ASPECT :N

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	STR asl	STR ask	CONS RT	PR pH	PR EFF	PR BND
C1	72	0- 6	10YR 4/6	10YR 6/6	fsl	0	111	1111	111	111		0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
BLUISH SALT AT SURFACE. OCCURS IN PATCHES AMONG WILLOWS.

HORIZON:
C1: DUPLICATE SAMPLE 75

SITE DESCRIPTION

SOIL SERIES: MARTINSDALE -T81TE NUMBER: 23 COUNTY : POWELL
TAXON : FINE-LOAMY, MIXED TYPIC ARGIBOROLLS (52B)
LOCATION : FORESEN PASTURE ADJACENT TO CLARK FORK
SE 1/4, SW 1/4, NE 1/4, SECTION 16, T7N, R9W

DATE : 07/07/85 1110 ELEVATION : 4530F 1380M PRECIP : 11.8 IN 299.7MM
MATERIAL : mixed alluviumVEGETATION :tame pasture LAND USE:pasture
DRAINAGE : mod. well PERMEABILITY:moderate EROSION :moderate
POSITION : footslope LANDFORM :terrace NUM.HOR.: 2
SLOPE : 2% 1.2 D ASPECT :NW

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS RT asl	CONS RT ask	PR pH	PR EFF	PR BND
C1	73	0- 5	10YR 4/6	10YR 6/6	sil	0	111	3322	722	111	0.0	1	12
IIA1	74	5- 11	10YR 2/2	10YR 3/3	sicl	0	452	4333	742	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
PASTURE WITH POA, REDTOP, CAREX (100% COVER). FIVE INCH
THICK TAILINGS DEPOSIT.
HORIZON:

IIA1: DUPLICATE SAMPLE 76

SITE DESCRIPTION

SOIL SERIES: T25 SITE NUMBER: 25 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : RAMSAY FLAT WEST LYSIMETER INSTALLATION
NE 1/4, NE 1/4, NE 1/4, SECTION 22, T3N, R9W

DATE : 07/25/85 1020 ELEVATION : 5300F 1615M PRECIP : 11.4 IN 289.6MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:disturbed land
DRAINAGE : poor PERMEABILITY:slow EROSION :severe
POSITION : level slope LANDFORM :disturbed land NUM.HOR.: 6
SLOPE : 1% 0.6 D ASPECT :SSW

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
C1	82	0- 7	10YR 4/5	10YR 6/5	sil	0	462	4322	111	111	0.0	1	21
C2	83	7- 17	10YR 4/4	10YR 6/4	sil	0	111	4322	111	111	0.0	1	12
IIA1	84	17- 24	10YR 3/2	10YR 4/2	sicl	0	454	5423	572	111	0.0	1	31
IIA12	85	24- 31	10YR 3/2	10YR 4/2	cl	0	111	5423	562	111	0.0	1	31
IIC2	86	50- 58	10YR 3/2	10YR 4/2	sicl	0	111	5433	262	111	0.0	1	21
IIIC3	87	58- 70	10YR 4/3	10YR 6/3	ls	0	111	1111	111	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
PROMINENT SALT CRUST AT SURFACE. IIC2 NOT SAMPLED BUT SIMILAR TO IIC1.

HORIZON:
C1: MOTTLES OF CHROMA 3 AND 6, TAILINGS VFS OR SILT

IIIC3: COARSE SAND PREDOMINATES

SITE DESCRIPTION

SOIL SERIES: T26 SITE NUMBER: 26 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : WHITE SALT CRUST SAMPLED AT SILVER BOW WELL LOCATION
SE 1/4, SE 1/4, SW 1/4, SECTION 13, T3N, R9W

DATE : 07/25/85 900 ELEVATION : 5350F 1630M PRECIP : 11.6 IN 294.6MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : poor PERMEABILITY:slow EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 1
SLOPE : 1% 0.6 D ASPECT :W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
X	92	0- 1	0/0	0/0		0	111	1111	111	111	0.0	1	11

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
WHITE SURFACE SALT SAMPLED.

HORIZON:
X: WHITE SALT CRYSTALS ON SOIL SURFACE.

SITE DESCRIPTION

SOIL SERIES: T27 SITE NUMBER: 27 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : SILVER BOW SELL LOCATION
SE 1/4, SE 1/4, SW 1/4, SECTION 13, T3N, R9W

DATE : 07/25/85 930 ELEVATION : 5350F 1630M PRECIP : 11.6 IN 294.6MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : poor PERMEABILITY:slow EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 1
SLOPE : 1% 0.6 D ASPECT :W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
X	93	0- 1	0/0	0/0		0	111	1111	111	111	0.0	1	11

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
BLUE SURFACE SALT PAIRED WITH SITE T26.

HORIZON:
X: BLUE SALT CRYSTALS ON SOIL SURFACE.

SITE DESCRIPTION

SOIL SERIES: T28 SITE NUMBER: 28 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : RAMSAY FLAT EAST LYSIMETER INSTALLATION
NE 1/4, NE 1/4, NE 1/4, SECTION 22, T3N, R9W

DATE : 07/25/85 1300 ELEVATION : 5300F 1615M PRECIP : 11.4 IN 289.6MM
MATERIAL : tailings VEGETATION :bare ground LAND USE:mill tailings
DRAINAGE : somewhat poor PERMEABILITY:mod. slow EROSION :severe
POSITION : level slope LANDFORM :disturbed landNUM.HOR.: 4
SLOPE : 1% 0.6 D ASPECT :SSW

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	STR asl	STR ask	pH	EFF	BND
C1	88	0- 9	10YR 4/5	10YR 6/6	vfsl	0	111	2211	111	111	0.0	1	21
C2	89	9- 21	10YR 3/4	10YR 5/4	fsl	0	111	3312	111	111	0.0	1	31
C3	90	21- 29	10YR 3/3	10YR 5/3	l	0	111	3322	111	111	0.0	1	12
IIA1	91	29- 51	10YR 3/2	10YR 4/3	sicl	0	454	5433	772	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
LITTLE SURFACE SALT ACCUMULATION.

HORIZON:
C1: MOTTLES OF CHROMA 3 AND 6.

IIA1: ORIGINAL SOIL SURFACE.

SITE DESCRIPTION

SOIL SERIES: T29 SITE NUMBER: 29 COUNTY : DEER LODGE
TAXON : COARSE-LOAMY, MIXED(ACID) SULFIC HAPLAQUEPTS
LOCATION : WARM SPRINGS FISHING ACCESS ON POINT BAR
SE 1/4, NW 1/4, SE 1/4, SECTION 18, T5N, R9W

DATE : 07/25/85 1830 ELEVATION : 4780F 1457M PRECIP : 11.6 IN 294.6MM
MATERIAL : tailings VEGETATION :riparian LAND USE:disturbed land
DRAINAGE : mod. well PERMEABILITY:moderate EROSION :severe
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 1
SLOPE : 1% 0.6 D ASPECT :SW

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
X	94	0- 1	0/0	0/0		0	111	1111	111	111	0.0	1	11

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
SAMPLE OF SALT ON POINT BAR IN TAILINGS DEPOSIT, 20 FEET FROM CLARK FORK RIVER.
HORIZON:
X: SALTS AT SURFACE SAMPLED.

SITE DESCRIPTION

SOIL SERIES: STRAW(COOL) - SITE NUMBER: 51 COUNTY : SILVER BOW
TAXON : FINE-LOAMY MIXED CUMULIC HAPLOBOROLLS (25B)
LOCATION : NW CORNER OF KONDA PASTURE
SW 1/4,NW 1/4, SW 1/4, NW 1/4 SECTION 16, T5N R9W

DATE : 06/27/85 1515 ELEVATION : 5280F 1609M PRECIP : 11.3 IN 287.0MM
MATERIAL : crystl. alluv. VEGETATION :peren. forage LAND USE:subirr. hay
DRAINAGE : well PERMEABILITY:moderate EROSION :slight
POSITION : footslope LANDFORM :alluvial fan NUM.HOR.: 3
SLOPE : 2% 1.2 D ASPECT :SSW

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
A1	107	0- 12	10YR 3/2	10YR 4/2	l	1	244	3323	762	342	0.0	l	31
B2	108	12- 22	10YR 3/3	10YR 5/3	fsl	0	254	2322	762	232	0.0	l	21
C1	109	22- 28	10YR 4/3	10YR 6/3	sl	1	111	2211	552	111	0.0	l	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
LOCATED JUST ABOVE MILES DITCH BELOW VOLCANIC OUTCROP

HORIZON:
A1: RECENT DEPOSIT FROM 0 TO 4 INCHES, DARK A1 4-12 INCHES

SITE DESCRIPTION

SOIL SERIES: STRAW(COOL) - SITE NUMBER: 52 COUNTY : SILVER BOW
TAXON : FINE-LOAMY MIXED CUMULIC HAPLOBOROLLS (25B)
LOCATION : NW CORNER OF KONDA PASTURE
SW 1/4, NW 1/4, SW 1/4, NW 1/4 SECTION 16 T3N R9W

DATE : 06/27/85 1540 ELEVATION : 5280F 1609M PRECIP : 11.3 IN 287.0MM
MATERIAL : crystl. alluv. VEGETATION :sedge & rush LAND USE:subirr. hay
DRAINAGE : mod. well PERMEABILITY:moderate EROSION :slight
POSITION : footslope LANDFORM :alluvial fan NUM.HOR.: 1
SLOPE : 1% 0.6 D ASPECT :SSW

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
A1	110	0- 6	10YR 3/2	10YR 4/2	1	1	344	3323	772	242	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
JUST BELOW MILES DITCH PAIRED WITH SITE A1

HORIZON:
A1: HIGH OM %

SITE DESCRIPTION

SOIL SERIES: (A3) SITE NUMBER: 53 COUNTY : SILVER BOW
TAXON : FINE-LOAMY, MIXED TYPIC HAPLAQUOLL (11A)
LOCATION : SW END OF KONDA FIELD ALONG RAILROAD TRACKS
SE 1/4, SW 1/4, SW 1/4, NW 1/4 SECTION 16 T3N R9W

DATE : 06/27/85 1625 ELEVATION : 5260F 1603M PRECIP : 11.3 IN 287.0MM
MATERIAL : alluvium VEGETATION :sedge & rush LAND USE:disturbed land
DRAINAGE : somewhat poor PERMEABILITY:moderate EROSION :moderate
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 3
SLOPE : 0% 0. D ASPECT :

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
C1	111	0- 15	7.5YR3/6	7.5YR5/6	1	0	254	4323	742	111	8.0	1	51
C2	112	15- 30	7.5YR3/6	7.5YR5/6	1	0	254	4323	542	111	8.0	1	21
IIA1	113	15- 46	10YR 3/2	10YR 4/2	sil	0	111	4323	442	111	8.0	1	31

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
SALT EFFLORESCENCE ON SURFACE WITH 505 BARE GROUND

HORIZON:

C2: COMMON INCLUSIONS OF SANDY RUST-COLORED TAILINGS
IIA1: WATER TABLE AT 43 INCHES, SAND BELOW 45 INCHES.

SITE DESCRIPTION

SOIL SERIES: TALLY(COOL) - SITE NUMBER: 54 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED ARIDIC HAPLOBOROLLS (135C)
LOCATION : ABOVE RAILROAD TRESTLE AT SPANGLERS NEAR SITE A7
SE 1/4, NE 1/4, NW 1/4 SECTION 30, T4N, R9W

DATE : 07/06/85 1610 ELEVATION : 5085F 1549M PRECIP : 10.6 IN 269.2MM
MATERIAL : crystl. alluv. VEGETATION :mixed midgrass LAND USE: range
DRAINAGE : well PERMEABILITY: moderate EROSION : moderate
POSITION : lower midslope LANDFORM :alluvial fan NUM.HOR.: 3
SLOPE : 4% 2.3 D ASPECT :S 50DEG W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	STR asl	CONS ask	RT	PR pH	PR EFF	PR BND
C1	118	0- 5	10YR 3/2	10YR 5/3	ls	5	111	1111	742	111		0.0	1	21
IIA1	119	5- 12	10YR 3/2	10YR 5/3	s	20	111	1111	743	111		0.0	1	31
IIC1	120	12- 24	10YR 3/2	10YR 4/3	ls	0	111	2211	542	111		0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
BASIN WILDRYE, AGSM, KNAPWEED. SITE IS ABOVE MAIN IRRIG.
DITCH AND IS LESS CONTAMINATED THAN A7. SMALL DITCH ABOVE.
HORIZON:
C1: VENEER OF SEDIMENT FROM OVERGRAZING (HICH CO. SAND %)
IIA1: ABUNDANT CO. SAND AND FINE GRAVEL

SITE DESCRIPTION

SOIL SERIES: TALLY(COOL) - SITE NUMBER: 55 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED ARIDIC HAPLOBOROLLS (135C)
LOCATION : SPANGLER NORTH PASTURE NEAR RR. TRESTLE N OF I-90
NE 1/4, SW 1/4, NW 1/4 SECTION 30, T4N, R9W

DATE : 07/06/85 1640 ELEVATION : 5075F 1546M PRECIP : 10.6 IN 269.2MM
MATERIAL : crystl. alluv. VEGETATION :bare ground LAND USE:pasture
DRAINAGE : somewhat exc. PERMEABILITY:rapid EROSION :severe
POSITION : footslope LANDFORM :alluvial fan NUM.HOR.: 4
SLOPE : 3% 1.8 D ASPECT :S 70DEG W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS asl	CONS ask	RT pH	PR EFF	BND
C1	114	0- 5	10YR 3/3	10YR 5/3	ls	20	454	4311	246	746	0.0	1	12
IIA1	115	5- 15	10YR 3/2	10YR 4/3	ls	30	111	1111	242	111	0.0	1	21
IIC1	116	15- 25	10YR 4/3	10YR 5/3	s	0	111	1111	111	111	0.0	1	11
IIIA1	117	25- 37	10YR 3/2	10YR 4/2	l	15	111	3323	111	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
CONTAMINATED BY PAST IRRIGATION. BARE GROUND (80%) WITH
BASIN WILDRYE, AGSM, AND LARGE LEAFY SPURGE
HORIZON:
C1: PAVEMENT FROM WIND EROSION, HIGH CO.S AND GRAVEL %.

SITE DESCRIPTION

SOIL SERIES: (A9) SITE NUMBER: 56 COUNTY : DEER LODGE
TAXON : FINE-LOAMY, MIXED TYPIC FLUVAQUENTS
LOCATION : DUTTON RANCH NEAR GOLD CREEK
NE 1/4, SW 1/4, NW 1/4, NE 1/4 SECTION 31 T1ON R1OW

DATE : 06/26/85 1700 ELEVATION : 3900F 1188M PRECIP : 15.5 IN 393.7MM
MATERIAL : mixed alluviumVEGETATION :peren. forage LAND USE:irrigated hay
DRAINAGE : poor PERMEABILITY:moderate EROSION :slight
POSITION : level slope LANDFORM :floodplain NUM.HOR.: 4
SLOPE : 1% 0.6 D ASPECT :W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS asl	CONS ask	RT	PR	pH	EFF	BND
A11	101	0- 5	10YR 4/3	10YR 5/4	fsl	0	232	2211	111	111	5.5	1		11	
A12	102	5- 10	10YR 4/6	10YR 6/6	ls	0	111	1121	111	111	5.0	1		11	
C1	103	10- 18	10YR 5/6	10YR 6/8	si	0	222	3212	111	111	4.5	1		11	
IIA1	104	18- 26	10YR 3/2	10YR 3/3	sil	0	242	3222	572	222	6.0	1		22	

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
SALTY ON SURFACE, BARE GROUND. SOIL IN ANO OLD OXBOW OF THE CLARK FORK. SOME CHLOROTIC POA, BRIN.

HORIZON:
A11: 0-3.5" 10YR 2/3 SiCL, 2.5-5" FSL
A12: SLIGHTLY STRATIFIED RECENT OVERBANK DEPOSIT.
C1: STRATIFICATIONS OF 7.5 YR 4/8, N/2, THIXOTROPIC
IIA1: ROCKS AT 26 INCHES, HIGH O.M. CONTENT.

SITE DESCRIPTION

SOIL SERIES: TALLY(COOL) -A$0TE NUMBER: 57 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED TYPIC HAPLOBOROLLS (135D)
LOCATION : THURMOND UPPER PASTURE
SE 1/4, NE 1/4, SE 1/4, NW 1/4 SECTION 20 T3N R8W

DATE : 06/27/85 1220 ELEVATION : 5450F 1661M PRECIP : 11.8 IN 299.7MM
MATERIAL : crystl. alluv. VEGETATION :peren. forage LAND USE:irrigated hay
DRAINAGE : somewhat exc. PERMEABILITY:moderate EROSION :moderate
POSITION : midslope LANDFORM :alluvial fan NUM.HOR.: 1
SLOPE : 8% 4.5 D ASPECT :N

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
A1	105	0- 5	10YR 3/4	10YR 5/4	1	2	243	3323	542	111	0.0	1	21

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:

HORIZON:

SITE DESCRIPTION

SOIL SERIES: (A11) SITE NUMBER: 58 COUNTY : SILVER BOW
TAXON : COARSE-LOAMY, MIXED TYPIC FLUVAQUENTS
LOCATION : THURMOND LOWER PASTURE 30 FEET EAST OF SBC.
NW 1/4, SW 1/4, NE 1/4, NW 1/4 SECTION 20 T3N R8W

DATE : 06/27/85 1309 ELEVATION : 5370F 1636M PRECIP : 11.7 IN 297.2MM
MATERIAL : tailings VEGETATION :peren. forage LAND USE:pasture
DRAINAGE : poor PERMEABILITY:mod. slow EROSION :moderate
POSITION : level slope LANDFORM :terrace NUM.HOR.: 1
SLOPE : 2% 1.2 D ASPECT :WNW

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	STR asl	STR ask	CONS	RT	PR	pH	EFF	BND
AC1	106	0- 9	10YR 4/3	10YR 5/4	fsl	0	223	2222	542	111	7.0	1	11			

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
NINE INCHES TAILINGS OVER FLOOD DEPOSITS.
WATER TABLE AT 17 INCHES.
HORIZON:
AC1: STRATIFIED WITH 7.5 YR 3/6 AND N/6 MATERIAL.

SITE DESCRIPTION

SOIL SERIES: (A12) SITE NUMBER: 59 COUNTY : POWELL
TAXON : COARSE-LOAMY, MIXED TYPIC HAPLOBOROLLS, ERODED (135D)
LOCATION : FORESON PASTURE ABOVE TRACE OF EAST VALITON DITCH
NE 1/4, NE 1/4, SE 1/4 SECTION 16, T7N, R9W

DATE : 07/07/85 1135 ELEVATION : 4600F 1402M PRECIP : 11.8 IN 299.7MM
MATERIAL : mixed alluviumVEGETATION :mixed midgrassLAND USE:pasture
DRAINAGE : well PERMEABILITY:moderate EROSION :moderate
POSITION : upper midslopeLANDFORM :alluvial fan NUM.HOR.: 3
SLOPE : 8% 4.5 D ASPECT :N 80-DEG W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	STR dmsp	CONS asl	CONS ask	RT pH	PR EFF	BND
A1	121	0- 5	10YR 4/3	10YR 5/4	sl	0	442	4322	742	544	0.0	1	31
B2	122	5- 14	10YR 4/4	10YR 5/4	sl	0	254	3333	742	544	0.0	1	31
C1	123	14- 40	10YR 4/4	10YR 5/4	fsl	0	111	3312	542	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
VEGETATION: WILD ROSE, AGSM, BASIN WILDRYE.

HORIZON:

B2: CAMBIC B HORIZON (DUPLICATE SAMPLE 77)
C1: DUPLICATE SAMPLE 78

SITE DESCRIPTION

SOIL SERIES: (A13) SITE NUMBER: 60 COUNTY : POWELL
TAXON : COARSE-LOAMY, MIXED TYPIC HAPLOBOROLLS, ERODED (135D)
LOCATION : FORESON PASTURE BELOW TRACE OF EAST VALITON DITCH
NE 1/4, NE 1/4, SE 1/4 SECTION 16, T7N, R9W

DATE : 07/07/85 1220 ELEVATION : 4600F 1402M PRECIP : 11.8 IN 299.7MM
MATERIAL : mixed alluviumVEGETATION :bare ground LAND USE:pasture
DRAINAGE : well PERMEABILITY:moderate EROSION :severe
POSITION : upper midslopeLANDFORM :alluvial fan NUM.HOR.: 4
SLOPE : 7% 4.0 D ASPECT :N 70DEG W

PROFILE DESCRIPTION

HOR.	NO.	DEPTH (IN)	COLOR MOIST	COLOR DRY	TEXT	CF %	STR gsk	CONS dmsp	RT asl	PR ask	pH	EFF	BND
C1	124	0- 3	10YR 4/2	10YR 5/3	sl	20	111	1112	111	546	0.0	1	12
IIA1	125	3- 8	10YR 3/3	10YR 4/3	fsl	5	244	3212	111	111	0.0	1	31
IIB2	126	8- 18	10YR 4/4	10YR 5/5	fsl	0	111	3212	111	111	0.0	1	31
IIC1	127	18- 38	10YR 4/3	10YR 5/4	fsl	5	111	3212	111	111	0.0	1	66

COMMENTS

CF = coarse fragment (%) STR = structure grade, size, and kind
CONS = moist,dry,sticky,plastic consistence RT = root amount, size, location
PR =pore amount,size,kind EFF =effervesence BND =boundary thickness,shape

SITE:
LARGE CONTAMINATED AREA BELOW DITCH.

HORIZON:
C1: DEPOSIT FROM IRRIG. DITCH, ROCK PAVEMENT SURFACE (DUPL.
IIA1: ABUNDANT MOISTURE UNLIKE A12 DRY THROUGHOUT. (DUPL #80

DRAFT

ATTACHMENT IV

DRAFT

ATTACHMENT IV-A
GROUND-WATER SAMPLING DECONTAMINATION PROCEDURES

MultiTech

DECONTAMINATION PROCEDURES

All materials and equipment used during the Silver Bow Creek RI were subjected to an appropriate level of decontamination. The type of decontamination performed was based upon procedures described in the project quality assurance plan (MultiTech and Stiller and Associates 1984, Appendix F) as well as those appropriate to the task.

The following are summaries of decontamination protocol followed for specific work tasks completed during the RI. Rationale for specific decontamination procedures is described in the project QA/QC plan.

Monitoring Well Construction and Soil Sampling

All drilling equipment and materials were decontaminated prior to any drilling operations and between borings. All tools used for soil sampling and packaging, including knives, split-spoon samplers, etc. were decontaminated prior to the collection of each sample. All materials used during well construction (casing, caps, etc.) were also decontaminated prior to use and between sites.

The following sequence was used for decontamination of drilling equipment and supplies and soil sampling equipment.

(1) Scrubbed visually clean with a detergent solution and a stiff scrub brush.

(2) Rinsed with clean water.

(3) Rinsed with deionized water and allowed to air dry.

Well Development and Aquifer Testing

All equipment used for well development and aquifer testing was decontaminated prior tc and after use at each well. This included decontamination of all piping, pumps, and surge blocks. The decontamination procedures were the same as those described previously for monitoring well construction.

Vadose Zone Monitoring Installations

Each lysimeter was decontaminated prior to installation by pumping approximately one liter of 8N hydrochloric acid through the apparatus in accordance with manufacturer's recommendations. This procedure was followed by pumping of approximately three liters of deionized water through each lysimeter to flush out any residual hydrochloric solution.

The lysimeters were installed in a 200 mesh silica-deionized water slurry, which was packed about the ceramic cup base of the unit. To dewater the silica slurry and to introduce formation water to the sampling apparatus, three bore volumes of water were evacuated and wasted prior to any sample collection efforts.

Tensiometers arrived on-site in a clean condition. The units were filled with a deionized water and ethylene-glycol solution to protect against freezing. Since tensiometers were not used for sample collection, no further decontamination of the units was completed.

Ground-Water Sampling

PVC and Teflon bailers utilized in ground-water sample collection were decontaminated before and after each use by a detergent wash, clean water rinse, dilute nitric acid rinse, and a deionized water rinse. The hoisting line for the bailer was decontaminated in a similar manner prior to its use at each well.

Bladder pumps and associated piping used for sampling were decontaminated using the following procedure:

(1) Scrubbed clean with detergent solution and stiff brush
(2) Rinse with clean water
(3) Rinse with 10% HNO_3
(4) Deionized water rinse (three times)

ATTACHMENT IV-B
SAMPLE CUSTODY AND DOCUMENTATION DESCRIPTION

SAMPLE CUSTODY AND DOCUMENTATION

Sample custody protocol and sample documentation were performed in accordance with those procedures outlined in the project quality assurance/quality control plan (QA/QC). These procedures were followed throughout the duration of the RI field investigation.

Sample Container Identification Tags

Each water and material sample container was identified with an adhesive tag which contained the following information: Sample station number, date sample was collected, time sample was collected, sample station location, samplers' names, preservation used (if any), type of sample (raw water, etc.), and remarks (if any).

Analyses Request Form (ARF)

Sample container sets from each sample site were accompanied by an analyses request form (ARF) similar to that shown in Figure 1. All laboratory analyses desired for a particular sample set were marked on the ARF; the original form was submitted to the laboratory for sample tracking, a copy of the form was kept on file by the sampler.

Printing No: 5
Version No: 3
Printing Date: 6-10-85

FIGURE 1
SILVER BOW CREEK REMEDIAL INVESTIGATION
WATER SAMPLE ANALYSES REQUEST FORM

FIELD ID/STATION: _____ LAB NO: _____
DATE: _____
REQUESTOR: _____

____SW II	____SW III	____GW Partial	____GW Complete
TSS	TSS	SO_4	Dissolved Ca
SO_4	SO_4	Dissolved As	Dissolved Mg
NO_3	NO_3	Dissolved Cd	Dissolved Na
Alkalinity	Alkalinity	Dissolved Cu	Dissolved K
Hardness	Hardness	Dissolved Fe	Alkalinity
Total Cu	Total Cu	Dissolved Pb	SO_4
Dissolved Cu	Dissolved Cu	Dissolved Zn	Cl
Total Zn	Total Zn		Fl
Dissolved Zn	Dissolved Zn		Dissolved As
Total Fe	Total Fe		Dissolved Cd
Dissolved Fe	Dissolved Fe		Dissolved Cu
Total Pb	Total Pb		Dissolved Fe
Total As	Total As		Dissolved Pb
Total Cd	Total Cd		Dissolved Zn
	Orthophosphate		
	Total P		

	Measurement	Method
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____

Chain of Custody (COC) Records

All samples collected were accompanied by a Chain-of-Custody (COC) Record similar to that shown in Figure 2. When transferring samples, the individual(s) relinquishing and receiving the samples signed, dated, and noted the time on the COC. This record was used to document sample custody transfer from the sampler to the laboratory and between Stiller and Associates' employees. Upon delivery of samples to the analytical laboratory, the original COC form was given to laboratory personnel, a copy was retained by sampling personnel.

Sample Packaging and Transport

Water and material samples were packaged in coolers during transport from a sampling site to the laboratory. The coolers worked effectively in keeping samples from freezing during the winter sampling episodes and, with the addition of ice, kept samples at a temperature of approximately four degrees centigrade during warmer months. The sample-filled coolers were typically transported by field vehicles to the analytical laboratory and were accompanied by appropriate documentation.

FIGURE 2
CHAIN OF CUSTODY

| Project Code | Project Name | | |

Field Forms

Field forms were maintained by Stiller and Associates' personnel to document sampling efforts at each sampling station. Information contained on the field forms included discharge data, field parameter measurement data, site conditions, instrument documentation and calibration information, and any appropriate field observations.

Field log books were also maintained by field personnel to maintain a record of work tasks completed other than sampling. Waterproof ink was used to make all entries in the log book. Entries in the log books included, but were not limited to:

- Name and title of author, date of entry, and description of weather conditions at the time of entry
- Descriptions of work task completed
- Locations of work task activities
- Data collected
- Remarks

ATTACHMENT IV-C
SILVER BOW CREEK GROUND-WATER
FIELD PARAMETER MEASUREMENT TECHNIQUES

MultiTech

FIELD PARAMETER MEASUREMENT TECHNIQUES

All field measurements performed during the Silver Bow Creek RI were made utilizing the same set of field instruments. All equipment was calibrated at a frequency and to an accuracy consistent with specific manufacturer's recommendations. Duplication measurements of field parameters were made at prescribed frequencies to check data reproducibility. As well, measurements of field blank samples were made to ascertain potential cross-contamination or procedural problems. Further discussion of field QA/QC procedures is contained in Appendix F, Laboratory Quality Assurance/Quality Control Program.

Water Level Measurements

Water level measurements were performed in a consistent manner throughout the duration of the RI. A datum was established for each well measured from which initial and subsequent water level measurements were made. The datum utilized was typically the top of the well casing on the north side.

Electric well probes were used to sound the depth to water. The same set of well probes were used throughout the study. Well probes were calibrated with a steel measuring tape periodically and adjustments were made to collected data when necessary. All measurements were made to the nearest 0.1 feet.

Temperature

Measurements of ground-water temperature were completed at all wells sampled during the RI. Field thermometers used were calibrated periodically to a factory-certified thermometer. Temperature of ground water was monitored during well evacuation; the final recorded temperature was obtained immediately following sample retrieval into a decontaminated beaker. All temperature measurements were recorded to the nearest 0.5°C.

pH

Field measurements of pH were performed on sample water collected in a decontaminated beaker. The same set of ph meters were used throughout the RI. pH meters were calibrated at the beginning and end of each sampling day and during the day when necessary. The following sequence was followed in obtaining field measurements of pH.

(1) Decontaminate pH probe with deionized water.

(2) Check pH against a pH 7 standard buffer solution; if pH reading is within 0.1 units of standard, proceed; if not, recalibrate instrument.

(3) Decontaminate pH probe with deionized water.

(4) Obtain pH readings from sample promptly until two successive readings are the same.

(5) Decontaminate equipment and record data on field forms.

Periodically, all pH meters used on the project were checked with a pH meter tester to insure all instruments were functioning properly. When field conditions (e.g. sub-zero temperatures) apparently affected the pH values obtained, appropriate notation was made on field forms.

Specific Conductance (SC)

Measurements of field specific electrical conductivity (SC) were made on sample water collected in a decontaminated beaker. All SC instruments were calibrated at the beginning and end of each sampling day. Adjustments were made to collected data if results from the two calibrations were significantly different.

The following sequences was followed in obtaining field measurements of SC:

(1) Decontaminate SC probe with deionized water.
(2) Perform red-line test on instrument; adjust as necessary.
(3) Obtain SC and temperature readings from sample until two consecutive readings are the same.
(4) Record data and decontaminate equipment.

Final SC values were calculated on site to adjust for temperature and the cell factor for each instrument. A comparison of acquired data was made to previous data collected at a specific site as a final check.

Dissolved Oxygen

Dissolved oxygen (DO) measurements were obtained from ground-water samples collected in accordance with the following procedure:

(1) Decontaminate probe with deionized water; inspect probe membrane, replace when necessary.
(2) Calibrate meter for temperature and elevation according to manufacturer's recommendations.
(3) Obtain DO readings from sample until two consecutive readings are similar.
(4) Record data on field forms and decontaminate equipment.

Values of DO were obtained during well evacuation and were monitored for consistency. Reported DO values were recorded when DO had reached equilibrium during latter stages of the well evacuation process.

Eh

Redox potential (Eh) was measured in ground-water samples collected in a decontaminated beaker. The Eh instrument and probe were checked prior to each measurement in accordance with manufacturer's recommendations. Appropriate decontamination was completed prior and after each use of the probe. A direct reading of Eh was obtained from sample water once relative equilibrium had been achieved in water evacuated from the well. Reported values were recorded once two successive readings were similar.